APRIL · 1960

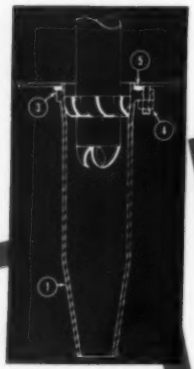
ROCK PRODUCTS

Retooled railroad pays off for Material Service
page 80

13 BIG REASONS WHY MULTICLONE DUST COLLECTORS

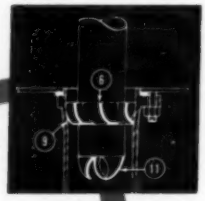
COST LESS TO MAINTAIN... ARE FAR SIMPLER TO SERVICE!

When you buy dust collection equipment, don't stop with a comparison of *initial* cost only. Compare also the costs and simplicity of keeping your dust collector at top-notch efficiency *throughout the years*. To the outstanding advantages of Multiclone's unique operating features, add the low cost and easy maintenance of this equipment and you'll see why Multiclones are the leading choice wherever *centrifugal* types of dust collectors are the most practical solution.



EASILY REPLACED COLLECTING TUBES

1. **CAST IRON TUBES** assure long wear!
2. **SPECIAL ALLOY TUBES** (FBA Inco #40, Chromehard and Ni-Hard) can be supplied where high temperatures or severe erosion are problems!
3. **TUBES ARE PRECISION-CAST** for exact fit into tube sheet. Tube lip protects sealing gasket!
4. **TIGHT LEAKPROOF FIT** of each tube is maintained indefinitely by special lock nuts!
5. **GAS-TIGHT JOINT** between tube sheet and each tube is assured by special gasket. Joint can be easily renewed when replacing tube!



PRECISION CAST VANES!

6. **CAST IRON VANES** resist erosion!
7. **SPECIAL ALLOY VANES** (FBA Inco #40, Chromehard and Ni-Hard) can be supplied where high temperatures or severe erosion are problems!
8. **VANES ARE EASILY RENEWED** by simply dropping new ones into place when changing collecting tubes!
9. **EXACT FIT OF EACH VANE** in the tapered collecting tube prevents erosive "blow-by"!
10. **CAPACITY AND EFFICIENCY** of the unit can be quickly altered by simply changing vanes. Assures easy adaptability to new operating requirements — big savings in plant modernization programs!
11. **SPIROVANES** (energy recovery devices) may easily be added to outlet tubes of existing installations to increase capacity or reduce pressure drop!

Plus These Important Advantages...

12. **CUBIC SHAPE** of Multiclone is easier to install and insulate — and requires only ONE simple inlet and outlet duct!
13. **BACKED BY OVER 3300 INSTALLATIONS** serving a wide cross-section of industry, each Multiclone benefits from the unequalled "know-how" gained during Western Precipitation's half-century of leadership in the highly-technical field of modern dust collection!

Compare the above advantages with any competitive equipment and you'll readily see why Multiclones are the logical choice for *your particular* operations, too. There's a Multiclone representative near you who will gladly supply further details to fit your individual requirements. No obligation, of course!

Send for descriptive literature on Multiclone equipment.

Only WP can do it all

1. COTTRELL Electrical Precipitators
2. MULTICLONE Mechanical Collectors
3. CMP Combination Units
4. DUALAIRE Jet-Cleaned Filters
5. THERM-O-FLEX Hi-Temp Filters
6. TURBULAIRE-DOYLE Scrubbers

Also: HOLO-FLITE Processors
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B.F.Goodrich

Oily bricks ride on Koroseal

THAT conveyor belt collects soft bricks from a cutting machine and brings them to the inspection area. The perfect bricks are then stacked for firing in a kiln, the rejects go back for reshaping. But finding a belt that could keep this production line moving was a problem. The bricks are heavily coated with diesel oil. This plus abrasive brick dust plus moisture ruined ordinary belts almost at once.

Various kinds of canvas and rubber belts were tried. But the oil would soak into the belt, blister the rubber, rot the fabric. When a B.F.Goodrich distributor heard of the problem, he suggested a belt made of Koroseal flexible material.

This B.F.Goodrich belt defies the stuff that ruins other belts—oil, grease, chemicals, most acids, alkalies. The Koroseal cover is tough, resists abrasion, cracking, peeling, never gets soft or sticky.

At last report the B.F.Goodrich Koroseal belt had been in service seven months (longer than any belt used previously), and showed no sign of wear or deterioration. In the meantime, the Koroseal belt has helped the plant step up production to an average of 38,000 bricks a day, made substantial savings in maintenance and labor costs.

Your B.F.Goodrich distributor has the exact specifications for the Koroseal belt described here. And as a factory-trained specialist in rubber products, he can answer your questions about the many products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Company, Department M-829, Akron 18, Ohio.*

Koroseal—T. M. Reg. U.S. Pat. Off.

B.F.Goodrich *industrial products*

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ROCK PRODUCTS

a Maclean-Hunter publication, Vol. 63, No. 4

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April 1960

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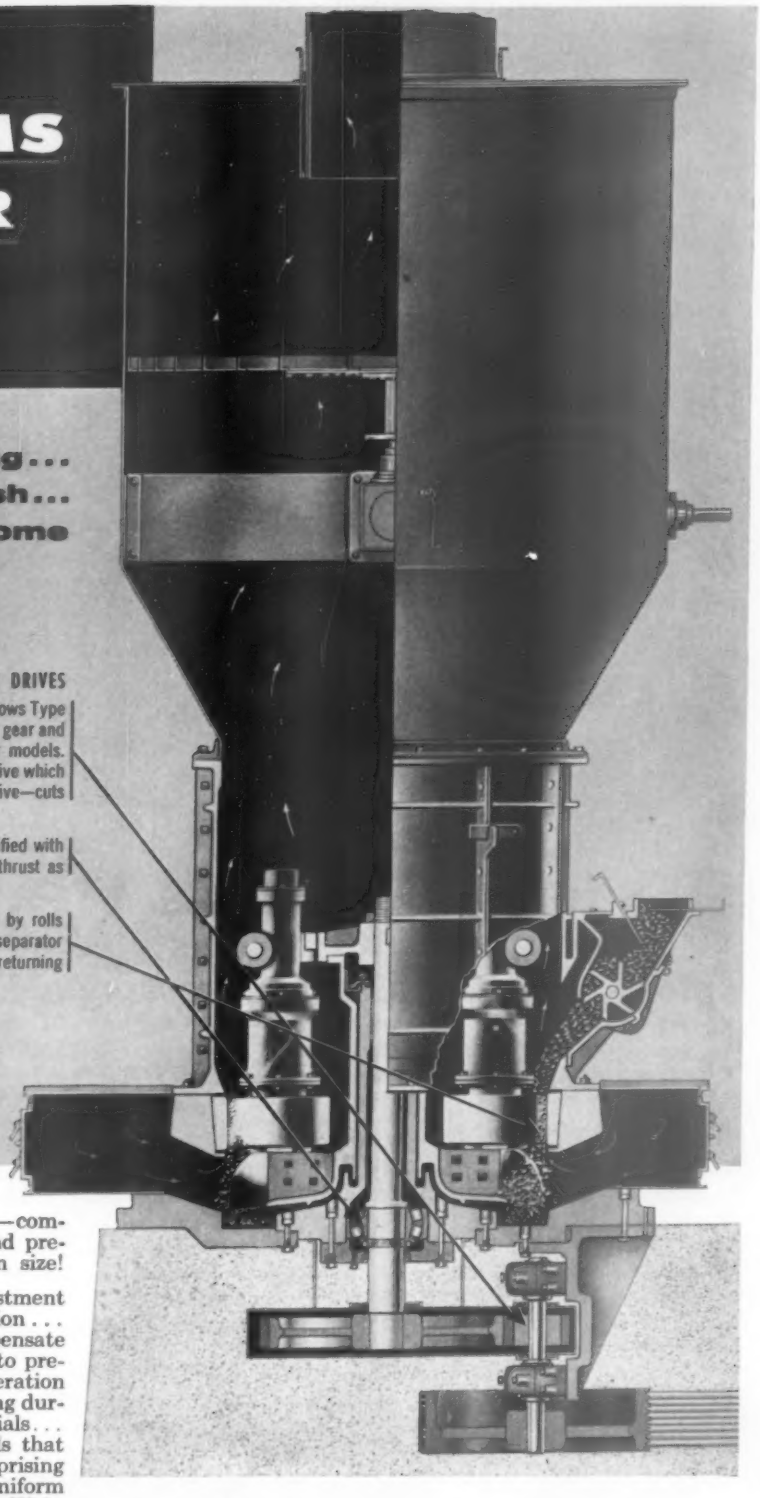
WILLIAMS ROLLER MILLS



- **Quality Fine Grinding... 20 Mesh To 400 Mesh... Micron Sizes On Some Materials**

EXCLUSIVE GEARLESS AND SPUR GEAR DRIVES

Another Williams advancement! Cutaway shows Type D Mill with Spinner Air Separator with spur gear and pinion drive used on Standard and larger models. Smaller sizes have simple gearless V-belt drive which is easier to maintain than bevel gear drive—cuts labor and downtime.

Bearing alignment of central shaft is simplified with only 2 bearings, the bottom one carrying thrust as well as radical load.

NOTE FLOW OF MATERIAL being ground by rolls rotating against bull ring, then air-swept to separator which discharges finished product while returning coarse tailings for regrinding.

From raw material to finished product—completely automatic grinding, blending and precision classifying to 20 mesh or micron size!

Self-adjusting feed rate . . . instant adjustment for sizing, even while mill is in motion . . . continuous automatic take-up to compensate for wear . . . constant rising air current to prevent build-up of fines and inefficient operation . . . automatically controlled hot-air drying during grinding of moisture-carrying materials . . . all are features of Williams Roller Mills that virtually guarantee increased output, surprising cost reductions and exceptionally high uniform quality. Get all the facts immediately . . . *Write today for catalog.*

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- Heavy duty grizzly with openings that give higher crush production with minimum scalping.
- Adjustable single eccentric plate feeder, clutch-operated.
- Operator's platform permits view of entire plant, controls centrally located.
- Can be equipped with sand rejector.

Diamond makes everything for the aggregate producer:

Jaw Crushers • Roll Crushers • Conveyors • Screens and Washers • Feeders and Bins • Portable and Stationary Crushing Plants for Rock and Gravel.

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High production *when you want it . . . where you want it.* That's the big feature of the *new* Diamond 1536 single-pass portable crushing plant. It can be readied in minutes for moving down the road or across the county and quickly set-up for more economical production. It's designed for counties, townships and contractors where tons produced must be high and mobility is a must.

You get dependable performance, and low operating cost from this rugged, compact plant equipped with a two-cubic-yard capacity loading hopper. The 24′ x 3′ 1½″ plate feeder, 15″ x 36″ jaw crusher, 3′ x 5′ 1½ deck vibrating screen and 30′ x 19′6″ delivery conveyor are mounted on a steel channel, gooseneck truck frame. It also carries the necessary drives, walkways, and ladders as well as optional equipment, including power unit, fuel tank, batteries, battery box and cables.

Delivery conveyor is hinged thus eliminating any dismantling for towing. The short wheel base and towing bar provide excellent maneuverability on road or in pit.

One way to be sure of getting the full story on the *new* Diamond 1536 is to see your Diamond distributor.

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KEEPING AHEAD OF THE CRUSHER!

7 NORTHWESTS for EVERETT QUARRIES, INC. Plattsburg, Mo.

ROCK IS THE BUSINESS of Everett Quarries, Inc., at Plattsburg, Missouri—ag-lime and road stone! Here in the home pit, this Model 41 Northwest swings out around 240 tons an hour to keep ahead of the crusher. Everett Quarries uses Northwests in all of their pits. This Model 41 is their seventh Northwest Shovel.

In pits like this dependability counts. Repeat order purchases demonstrate a recognition of the performance you are looking for. *Your Northwest is always ready to go. We hear it everywhere, and Northwest users will tell you so.*

Your Northwest is built for the toughest job a shovel has to do. It's a *real* Rock Shovel—proved in years of service by reliable operators like Everett and other pit operators throughout the Midwest. It gives you higher output in rock and makes the easy digging easier. Smooth control, accurate spotting, the jerk-free swing that comes with Uniform Pressure Swing Clutches, and the Northwest Dual Independent Crowd combine to pour out the material. There are no slow-downs or delays in a Northwest digging cycle!

There is a lot more to the story. Ask for complete details on the size machine you need.

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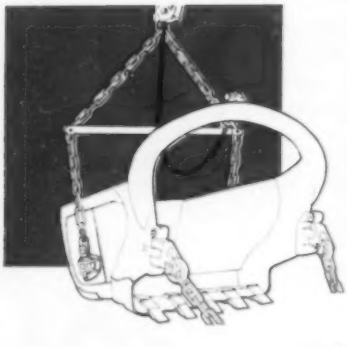
NORTHWEST EQUIPMENT IS BUILT IN THE FOLLOWING SIZES

SHOVELS	CRANES	DRAGLINES	FULLSHOVELS	TRUCK CRANES
¾ Yd. to 2½ Yd. Capacity	13-Ton to 60-Ton Capacity	¾ Yd. to 3 Yd. Capacity	¾ Yd. to 2½ Yd. Capacity	25-Ton to 35-Ton Capacity

Still smashing production records...



Streamlined and rugged, *ESCO* Triple Tapered Dragline Buckets continue to establish new highs for production in all kinds of stripping, excavating, loading or materials rehandling.

This record-smashing performance results from the Triple Tapered Design that reduces friction and makes *ESCO* dragline buckets load faster and dump cleaner with minimum line pull. Materials flow easily into the tapered basket, filling the bucket quickly without voids in the rear. The high, hollow-cast arch allows maximum clearance when dumping. All-welded, rivet-free construction, plus maximum use of alloy steel castings at all critical stress and wear points make these buckets the strongest, pound for pound, and the longest lasting buckets with the lowest maintenance cost.

ESCO Triple Tapered Dragline Buckets are available in a wide range of sizes and weights. Ask your *ESCO* dealer for details, or write for *ESCO* Catalog No. 188. You may also want a copy of *ESCO* Dragline Replacement Parts Catalog No. 108.

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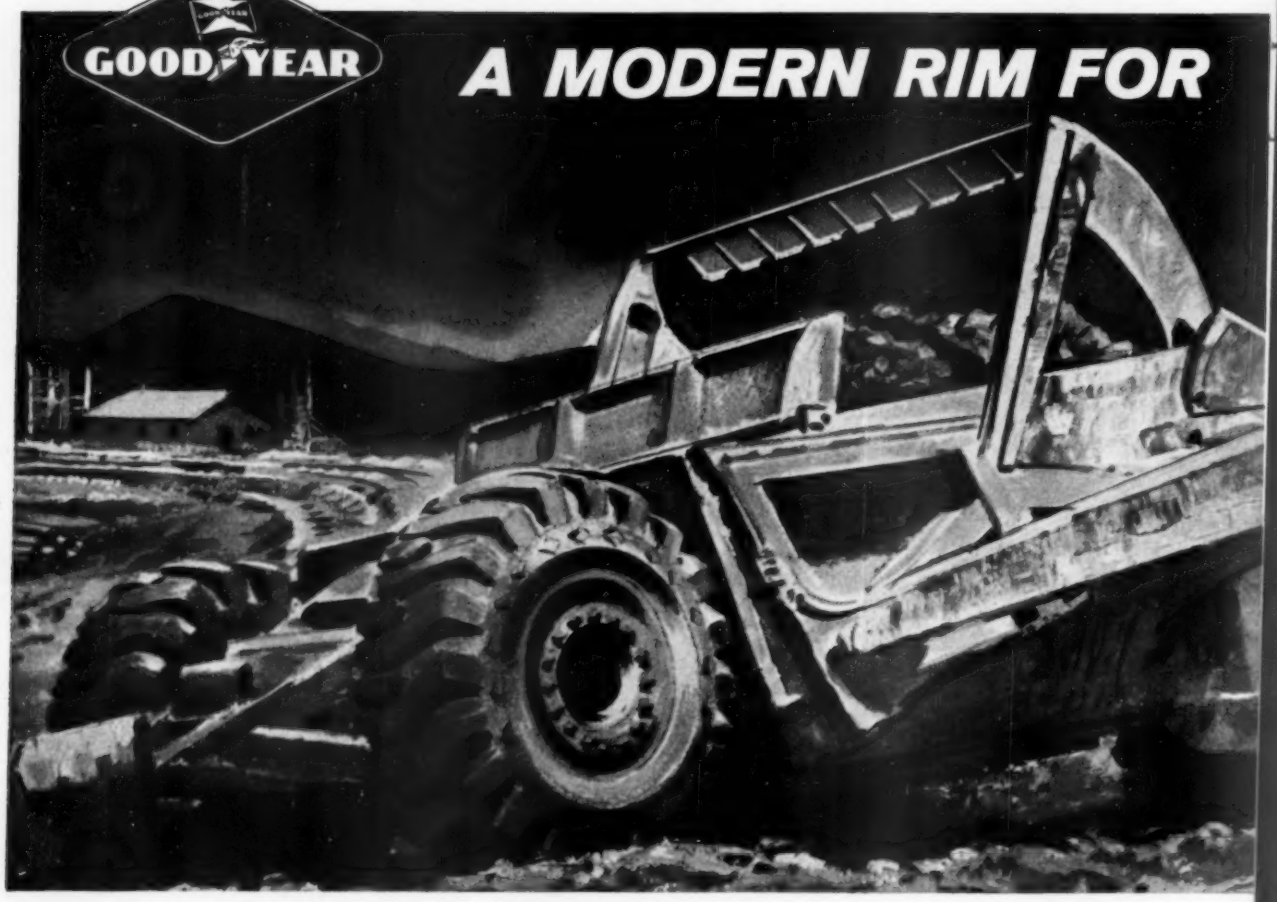

The New Earth-Mover

40% Stronger—only 6% Heavier

Today's earth-movers are carrying bigger loads than ever—and moving them faster, too.

To meet the added strain imposed on rims, Goodyear, long-time leader in rim development, has introduced a complete new line of Earth-Mover Rims. Although 40% stronger, these new rims are only 6% heavier.

With Goodyear rims you enjoy such added benefits as a heavy-duty bead seat band driver—to prevent slipping under severest operating

Buy and Specify RIMS by **GOOD**

TODAY'S MASSIVE LOADS

Rim

Only Goodyear Rims
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against rust and corrosion

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Goodyear makes rims in widths up to 37″ and in diameters up to 49″. To prevent premature tire and rim failure, it pays to buy and specify rims job-fitted by Goodyear. See your local rim distributor, or write: Goodyear, Metal Products Division, Akron 16, Ohio.

Send for Free Goodyear Rim Catalog
—84 pages of facts and pictures on Goodyear's complete line of rims for every type of vehicle.

GOODYEAR

More tons are carried on Goodyear Rims than on any other kind

Tru-Seal—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

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Smidth

CEMENT COOLERS

The Smidth Cement Cooler, developed especially for cooling hot cement to temperatures acceptable for bulk shipment or immediate bagging, is externally water-cooled. The hot cement is introduced at the base and conveyed in a thin layer along the cooled interior surface to the top. High cooling efficiency is assured by the intimate contact of cement and the water-cooled surface.

The Smidth Cooler may also be used with many other similar dry pulverized materials.

Illustrated: Two 6′ 6″ diameter by 17′ 7″ high Smidth Coolers ready for shipment.

F. L. SMIDTH & CO.

INCORPORATED

ROCKEFELLER CENTER

1270 Ave. of the Americas, New York 20, N. Y.

WHAT'S HAPPENING

IN OTHER FIELDS OF INTEREST TO THE ROCK PRODUCTS INDUSTRY

April, 1960

Durable, oil-resistant pavement in a choice of colors is approaching reality as tests progress at Esso Research and Engineering Co. Road sections and curbs are being studied under moderate traffic conditions, prior to full-scale field tests in heavily traveled areas. Sand and crushed stone aggregates are compounded with thermo plastic materials to form a 1-in.-thick upper layer or surface of pavements—the colorless plastics can be pigmented any color. According to Esso, conventional mixing and laying methods can be used. The development grew out of Esso's study of structural materials that could be made from petroleum products. The plastic materials used are derived from oil gases and include polypropylene, as well as polyethylene and polyisobutylene.

Tunnel builders in England kill two birds with one stone by pumping excavated materials—chalk and flint—to the surface as a slurry, then using the slurry for building flood banks. The project is the Dartford-Purfleet Tunnel that will pass under the Thames to connect Kent and Essex. Tunnel linings are 28 ft. diam. As the 30-ft. diam. shields are advanced by hydraulic rams, cast-iron rings are built behind them to form the linings. Excavated material is loaded onto shaker conveyors leading to a crusher; there, it is mixed with water and pumped out. Centrifugal pumps are capable of handling solids up to an inch in size.

Clean white sand will be the byproduct if attempts to process oil along Canada's Athabasca River in northern Alberta are successful. There are 40 billion bbl. of recoverable oil in sands at or near the surface and vast additional reserves underground. Four companies have combined to push a research project in which the first step will be construction of a $15-million extraction plant at Mildred Lake. One of the techniques that may be used: a mining wheel that has six buckets. These would strip the sand from the surface, then drop it on a conveyor belt for delivery to the extraction unit. Clean sand would be returned to the mined areas.

There is a stretch of rubberized road in Tennessee that has been under scrutiny by highway researchers. Occurring on Route 68 between Sweetwater and Madisonville, the test road is a cooperative undertaking of the Tennessee Highway Research Program and the Natural Rubber Bureau Research Laboratory. About 1,600 vehicles a day travel over the nine-mile test road. There are six sections using the test material—asphalt and natural rubber latex—as a binder for aggregates. These alternate with other sections in which no rubber is used.

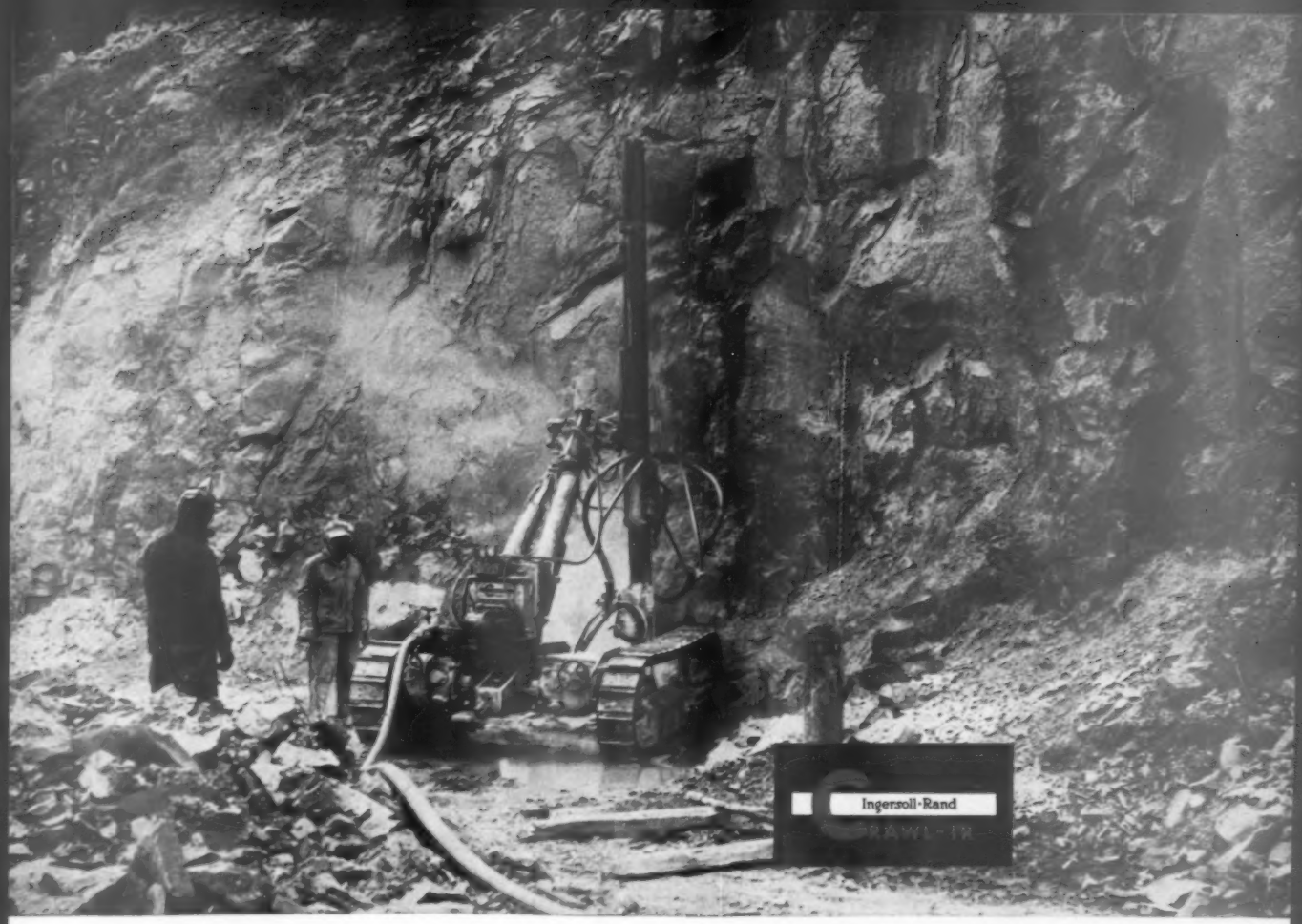
Going prospecting on the bottom of the ocean will be the Aluminaut, a deep diving (15,000 to 18,000-ft.) submarine. It has been developed by scientists at Southwest Research Institute near San Antonio, Texas, for exploration of the ocean floor, and tests are being made of a scale model. In the full-size craft, space will be provided for a pilot and two scientific observers and more than 3,400 lb. of instruments. The device has promise for the military and industry. There are chemical and mineral raw materials down there worth going after—for example, an estimated $500,000 worth of cobalt and manganese nodules per square mile. If the Aluminaut were equipped with master-slave manipulators—those mechanical hands used in moving radioactive substances—they could operate mining or collecting equipment carried as ballast.

Impurities are being removed from crude rock salt in a trial run of a new radiant-heat separation method. Developed by International Salt Co. and Battelle Memorial Institute, the process has applications for other rock producers. This is the way it works: Crushed rock salt is passed under infrared lamps, then dumped onto a high-speed conveyor belt coated with a heat-sensitive resin. Transparent to the rays, the relatively cool, pure salt crystals fly off the end of the belt to a catch bin. Warm impurities that have absorbed the rays, however, stick to the belt a little longer, leave with less momentum. They drop into a bin closer to the end of the belt and separation is accomplished.

Lights that can withstand the weight of 125-ton aircraft have been set flush in the concrete of a new runway at New York International Airport to guide a pilot in setting his plane down. The $12-million airstrip was opened in mid-February. Dutch-designed, the system was constructed in the United States by General Electric Co. and Structural Concrete Products Corp. At each end of the runway are double lanes of lights, 60 ft. apart, that extend 3,000 ft. toward the center. A single, 5,400-ft. strip of lights in the center joins the two double rows. The lights are set below steel gratings that protect them and direct their beams. Like the landing guidelights, new quartzline lights have been installed along the taxiways leading from the lighted runway. These, too, can stand the weight of heavy aircraft passing over, and are designed to melt snow and ice.

Planters in a hurry try seed-in-a-slurry. Chemical Engineering magazine reports a field test of a new process to quickly establish sod on embankments and levees. It consists of mixing specially prepared wood pulp, grass seed and fertilizer into a water slurry and spraying it over slopes. The mixture dries quickly to form a papier-mache-like blanket which encourages seed germination while it protects slopes from erosion.

Freeze-ups traceable to water can be prevented in diesel fuel systems with the use of a pill that detects water in fuel oil storage facilities. For testing, the pill is added to a small amount of fuel, turns it pink or purple if water is present. The product, "Hydrokit," was developed by Esso Research for use in jet fuel, but has other applications.



ONE CRAWL-IR
replaces two churn drills

The CRAWL-IR shown above, powered by a 600-cfm Gyro-Flo compressor, not only replaced *two* churn-type drills but speeded blast-hole drilling at the same time. This power-packed combination keeps ahead of an aggregate mill that handles 2500 tons per 8-hour shift. Using 3" Carset bits, holes are drilled about 35 ft. deep on a 10 by 12 ft. pattern. The CRAWL-IR practically eliminates setup time, as all tower positioning is hydraulically controlled.

The Gyro-Flo rotary compressor is the CRAWL-IR's ideal running mate — smaller, lighter, smoother running, with outstanding dependability and freedom from maintenance. Air temperature stays under 200°F, oil consumption is low and pressure is automatically regulated within close limits at all loads from 0 to 100% capacity.

For rock-bottom drilling costs, ask your Ingersoll-Rand distributor or engineer for complete information on CRAWL-IR drills and Gyro-Flo compressors.

Ingersoll-Rand
65A14 ♥ 11 Broadway, New York 4, N.Y.

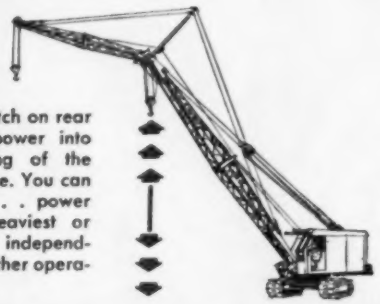
A CONSTANT STANDARD OF QUALITY IN EVERYTHING YOU NEED FOR DRILLING ROCK

Only with LINK-BELT SPEEDER Full-Function Design...

perform up to 6 operations

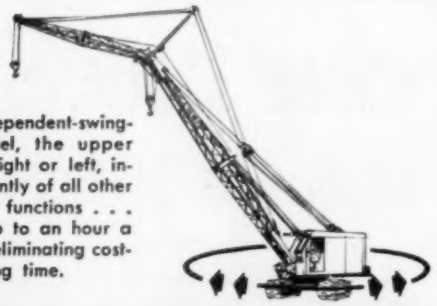
simultaneously or

1 POWER UP OR DOWN MAIN LOAD LINE

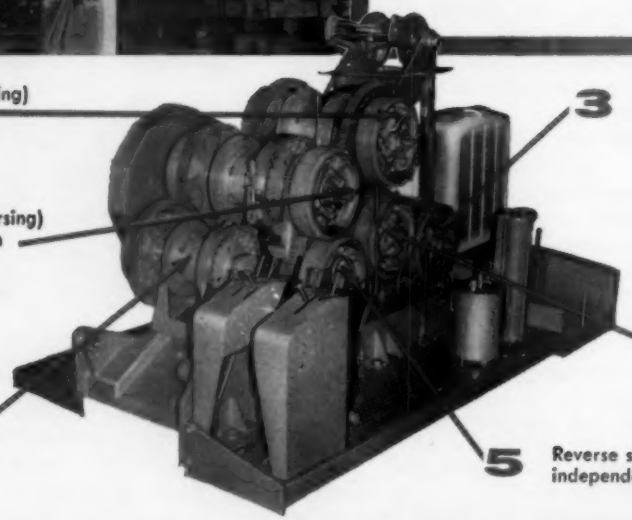


Reversing clutch on rear drum puts power into load lowering of the main hoist line. You can power up . . . power down the heaviest or lightest loads independently of all other operations.

4 SWING RIGHT OR LEFT



With independent-swing-and-travel, the upper swings right or left, independently of all other machine functions . . . saves up to an hour a day by eliminating costly shifting time.



1 Load lowering (reversing) clutch for rear drum

2 Load lowering (reversing) clutch for front drum

3 Boom lowering clutch

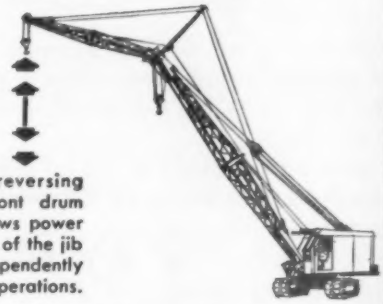
4 Reverse shaft for independent swing

5 Reverse shaft for independent travel

6 Independent third drum

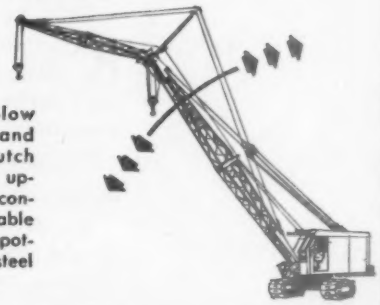
independently!

2 **POWER UP OR DOWN SECONDARY LOAD LINE**



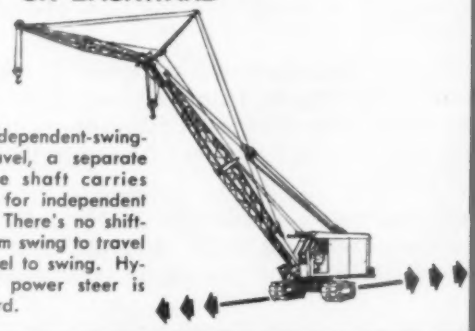
Exclusive: a reversing clutch for front drum also . . . allows power load lowering of the jib whip line independently of all other operations.

3 **HOIST OR LOWER BOOM UNDER POWER**



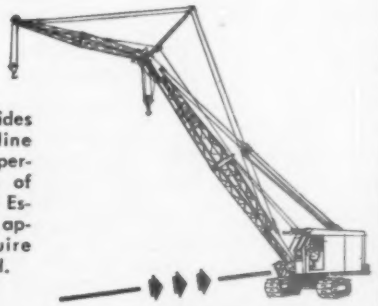
Independent high-low speed boomhoist and boom lowering clutch provide fast, safe up-and-down booming control. Especially valuable for high-accuracy spotting jobs such as steel erecting.

5 **TRAVEL FORWARD OR BACKWARD**



With independent-swing-and-travel, a separate reverse shaft carries power for independent travel. There's no shifting from swing to travel or travel to swing. Hydraulic power steer is standard.

6 **OPERATE INDEPENDENT THIRD DRUM**



A third drum provides one more load line which, again, is operated independently of all other functions. Especially useful for applications that require "snaking" in a load.

Link-Belt Speeder's years-ahead Full-Function Design is standard on all models up through the 40-ton "108" Series. Because of this exclusive design concept, your operator can have completely independent control of *all* lifting or excavating applications. He can power individual load lines up or down, crowd or retract, swing and travel, boom up or down — all individually, or in any combination, depending on the job.

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EDITORIAL

by GEORGE C LINDSAY

The truth about railroad cost-finding

RAIL CARRIERS have been shaken roughly out of their lethargic attitude toward shipping problems of aggregates producers. After a couple of hard rights to the head, railroad and Interstate Commerce Commission accountants are stewing in their own figures.

The punches were delivered by the National Sand and Gravel Association, mainly through the untiring efforts of Mr. Ellis E. Jensen of Janesville, Wis.

Mr. Jensen began training for his fight several years ago by digging deeply into cost-finding practices of ICC and the carriers. He found several weaknesses in their methods, and he told them so.

One of those weaknesses is the pernicious rumor that railroads are going broke. Jensen says they're not, and don't have to. As far as freight is concerned, railroads are as financially sound as many big U. S. corporations. Their trouble lies in "a temporary sapping of strength by the virus of passenger service losses."

Another weakness he pounded home was prejudice of railroads against short-haul freight traffic because it is unprofitable. Jensen set out to prove that the reverse is true. He found, in studying returns on railroads' equity capital from freight traffic alone, that it compares most favorably with experience of other industries and utilities.

What's the answer? Mr. Jensen summed it up like this at the recent NSGA convention: "The answer is more short-haul traffic, at rates that will get the business, and partial elimination and partial subsidy of existing passenger service."

The industry should join him and the Association in quashing ignorance, misinformation and defeatism about railroad earnings. You can do this:

(1) Protest the fallacies of ICC cost-findings on short-haul freight traffic.

(2) Insist on cutting out nonvital passenger service, and a subsidy on that which is vital.

(3) Sound off against featherbedding and similar practices.

(4) Tell the facts; help restore public confidence in economic soundness of railroads.

If successful, great savings in cost will result, since railroad freight rates represent the biggest single cost item in producing and getting products to market.

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Just as you use specialized equipment for a particular job, it pays to use the right kind of wire rope designed for that equipment.

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With this in mind, you can see the reason "why" Macwhyte offers such a wide variety of wire rope:

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* Special lubrication is available in accordance with the needs of the equipment or the type of service in which the rope will be used. The tenacious lubricants provide just the necessary protection — are unaffected by heat or cold, dry or wet conditions.

* Product engineers determine the exact number, size, and relationship of the wires needed to meet the requirements of your equipment. You're sure of the correct size, strength, and flexibility.

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Result: Whyte Strand wire rope is literally "custom made" for shovel hoist rope, dragline, clamshell crane rope, boom hoist line, dozer rope, scraper rope, contractors' hoist and derrick rope, overhead cranes, cableway excavators, and winch lines. If you'd like to check the type of rope recommended for your equipment, send for bulletin 5702 — free for the asking.

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Material Service Corporation is one of the top ten among the nation's aggregate producers and is still expanding. A big reason for the success of this materials supplier is because "Service" is more than just a middle name — it's the keystone of their philosophy.

Another "good habit" throughout the organization is the constant study of new and more efficient machinery and methods that can be successfully used in its many plants. As a part of this continuous improvement program, eight of the new Hough model H-120 "PAYLOADER" tractor-shovels have been purchased and put to work at their many sand and gravel plants in Illinois and Indiana since this big machine was introduced in 1959.

A typical work-day for any one of Material Service's H-120's is a continuous 16-hour shift from 5 AM to 9 PM: truck-loading from 8 AM to 4:30 PM; stockpile-building, trimming and clean-up during the other 7½ hours.

One of these big machines can go from one end of a big yard to the other in a matter of seconds to do a job. It operates as easily and cycles as fast as smaller loaders, yet easily handles 6-tons per pass. It enables you to give customers that quick, no-wait truck-loading service that is so important today. Its controlled dumping and its exceptionally long reach and high lift can load small trucks gently or large trucks fully.

Chances are it will pay you to use big, fast Model H-120's or smaller "PAYLOADER" tractor-shovels too. Your nearby Hough Distributor offers you the widest range of sizes and models, and the most complete service-parts facilities, backed by factory service personnel, to make your "PAYLOADER" investment pay.

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An H-120 "PAYLOADER" fills its bucket with sand or gravel easily and quickly because of powerful traction and tremendous break-out force. Bucket tips back 40° at ground.

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ROCKY'S NOTES

by NATHAN C. ROCKWOOD

Lime and lime products in Germany

OUR FRIEND, Bob Boynton, general manager of the National Lime Association, has kindly favored us with a copy of his report to members on his observations concerning a recent trip to Western Germany and other Central European countries. We find it of quite general interest, and in many respects suggests some comments of our own, based on long observation and acquaintance with the lime industry in this country and elsewhere in the world.

It was, of course, known that Germany produces and consumes a far greater per capita amount of lime than the United States. Presumably it was partly to account for this difference that Mr. Boynton made his trip there. For example, Western Germany's total consumption of lump and pulverized quicklime is almost as much as in the United States, a country many times the size. This difference is accounted for by a much greater use of lime in all categories—metallurgical, building and agriculture. Considering each in turn, as to possibilities of promoting greater markets in the U.S.A., the following appear to be logical conclusions (our own, in most instances, rather than Boynton's).

The greater use of lime, instead of limestone, in German manufacture of steel is largely because of the character of the ores used, some differences in manufacturing processes, and the fact that the grade of lime used for this purpose can be somewhat inferior to American commercial grades. There is reason to believe that improved blast-furnace processing in the U.S.A. will eventually increase the use of lime, but the conversion of the steel industry to the extensive use of lime in place of limestone in this country is not in immediate prospect, although there are some arguments in favor of the use of lime in all blast furnaces.

The other product which accounts for the much greater market for lime in Germany, is building or structural lime. This is explained, apparently, by the German retention of the use of lime for plaster, mortar and exterior stucco, where in our own country this market has been lost in large measure to competitive materials—gypsum for plaster, portland cement and special masonry cements in the case of mortar. The exterior stucco market has been almost lost, according to our observation, largely through unfortunate experience some 30 or 40 years ago with various patented magnesite stuccoes. Most homeowners were unable to distinguish the difference in various kinds of stucco. They simply ceased to buy stuccoed houses, because the stucco cracked and scaled.

There are many advantages in a good stucco job, as our German friends no doubt appreciate, especially in this day when the cost of painting a wooden frame house is a good sized fraction of the original cost of an older dwelling. So, Mr. Boynton reports, "the biggest German use of building lime today is in exterior stucco; in fact, about 80 percent of all new homes, apartments and institutions are stuccoed. This is not a new trend. Stucco has been widely used in Germany since medieval times." In other words, the Germans are unwilling to abandon a proved good construction material.

Why the practical abandonment of stucco in the U.S.A., and its continued and expanding use in Germany? First, we think is workmanship. Germans are notoriously capable and conscientious craftsmen. Second, the stucco is applied to clay brick or tile, sand-lime brick or block, or concrete block, without lathing or furring. This is the way stucco was intended to be applied. There are still examples of such stucco in surviving American colonial buildings.

Stucco troubles in this country began when it was applied over wood-frame buildings, subject

Please turn to page 154

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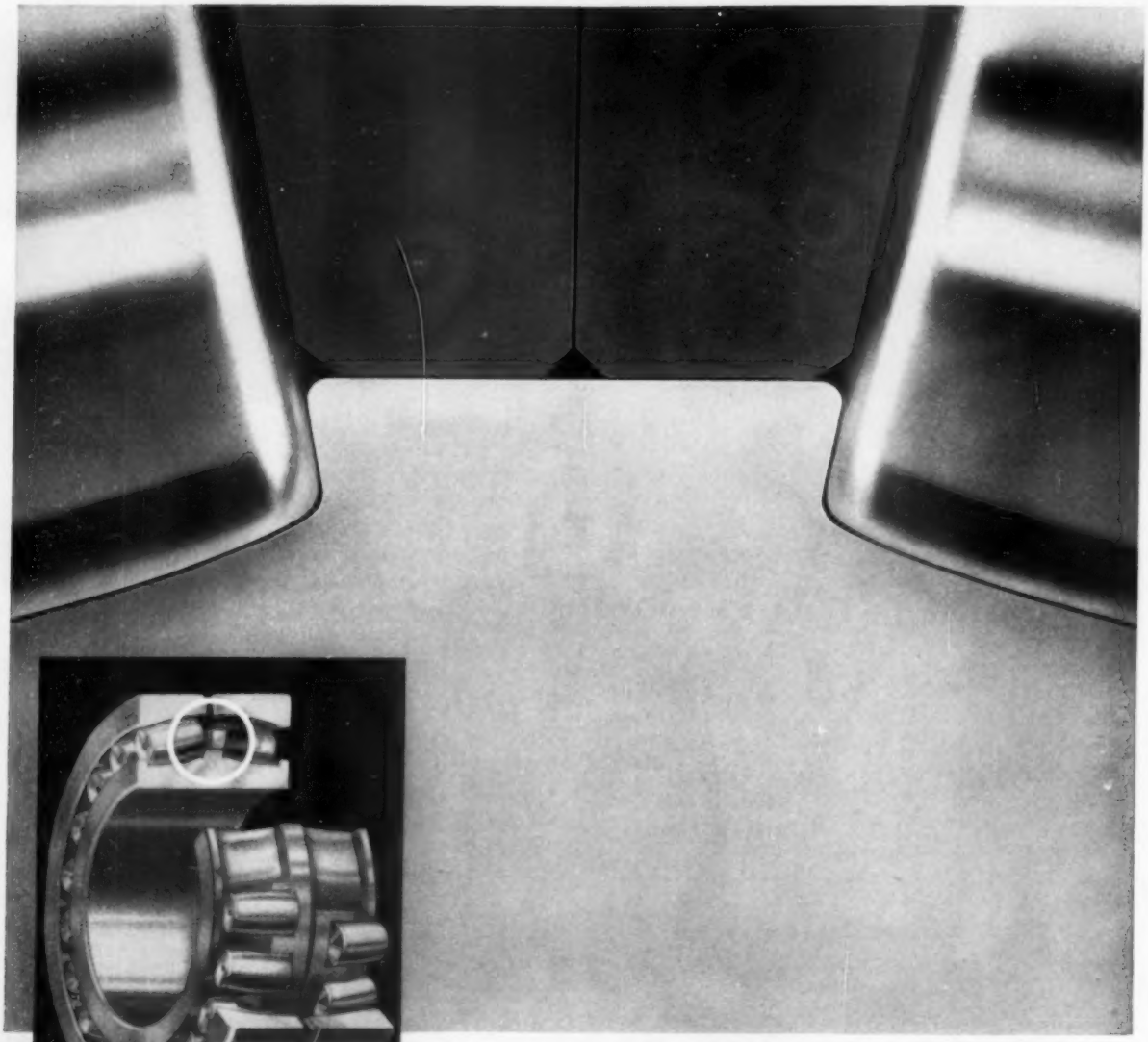

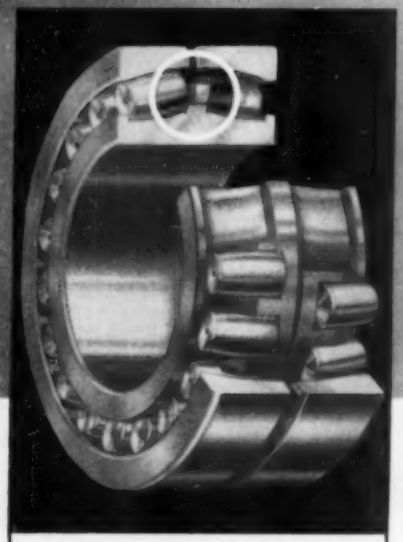

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WASHINGTON LETTER

by EDGAR POE

Equipment Manufacturers H. A. Radzikowski, chief of the division of development at the Bureau of Roads, says that modern highway construction equipment in this country is improving all the time. Contractors have encouraged equipment manufacturers to make their machines more efficient in the highly mechanized work.

For instance, he pointed out, in an address to the annual convention of the American Road Builders' Association, that the modern paving train and its allied equipment has a whole series of improvements.

Paving train Ups surfacing New bituminous pavers, combined with pneumatic tires and steel-wheeled rollers, form a paving train that doubles the rate of bituminous surfacing that can be put down with better quality. Automatic controls also have been installed on portland cement concrete batching plants to increase both productivity and accuracy of proportioning. Despite the improvement, however, in both paving and allied equipment, he said there are other areas where improvements might be made.

Mr. Radzikowski pointed out what numerous members of Congress had already been told about the vast highway construction program: the entire highway industry has already demonstrated it has the productive capacity, the know-how and the flexibility to carry out the program on schedule if the funds are made available.

Numerous outstanding papers and discussions were given at the annual meeting of the Highway Research Board in the Nation's Capital. There were several involving concrete, cement, asphalts and lime.

Engineering Developments Engineers from the various states agreed that population increase and economic growth have created an ever-increasing demand for more and better highways to serve national, state and local needs. To meet the demands, highway programs have been expanded. At the same time, large amounts of land required by the new highways have aggravated the already competitive land use situation. As a result right-of-way costs are going up all the time.

Significant among engineering developments has been the trend to by-pass communities, build on new location or to relocate highways without access to abutting properties.

Insurance Measures Introduced Approximately 10 million of the 16 million people over 65 are currently receiving monthly old age or survivor's insurance benefits. Under this tremendous insurance program some 14,600,000 people of all ages will receive in 1961 $11.7 billion in old age, survivor's and disability benefits.

A series of identical bills in this election year are pending in the House and Senate to liberalize social security system benefits. Included are bills that would: remove the $1,200 a year ceiling on earnings of persons receiving social security; permit men to draw reduced benefits at 62, women at 60; eliminate the minimum of 50 years for persons seeking disability benefits.

Cement Dumping Investigation The United States Tariff Commission early in the New Year was conducting an investigation, on advice from the Treasury Department, as the outgrowth of a complaint that Portland cement manufactured by the St. Lawrence Cement Co., Ontario, Canada, is being or is likely to be sold in the United States at less than fair value.

The Tariff Commission launched its inquiry under the 1921 Anti-dumping Act, as amended, to determine whether an industry in the United States is being or is likely to be injured, or is prevented from being established, by reason of the importation of such cement into the United States.

Huge public Works program Federal activities in public works and other construction have grown tremendously. Direct Federal construction currently constitutes 7 percent of the total value of new construction. On top of this, state and local public works benefiting from Federal grants represent an additional 7 percent, two-thirds of which is financed by Federal grants.

A record $2.1 billion in expenditures for direct Federal construction of civil works ($252 million more than 1960) is now scheduled for fiscal 1961 starting July 1. However, total Federal public works expenditures in 1961 are estimated as lower than fiscal 1960, primarily because of the outlook for less highway money from the trust fund.

Total expenditures for the coming fiscal year will reach an estimated $6.9 billion as compared with $7.3 billion estimated for 1960. Grants for Federal-aid highways will decrease by about $300 million. Nevertheless, even with a slight slowdown, the highway program will account for about half of the total estimated expenditures for civil public works for fiscal 1961.

Under the Highway Act the Federal government and the State and local governments each pay 50 percent of the cost of primary, secondary and urban roads. By terms of the 1956 Highway Act the Federal government pays 90 percent of the cost of the divided, multi-laned interstate highways, and the states 10 percent, plus the upkeep.

In 1961, an estimated 9,000 projects are scheduled to be approved under these Federal-State-Local programs. The Federal share will approximate $2.9 billion.

A Department of Commerce spokesman pointed out that all of these projects will use a tremendous amount of rock products. Every section of practically every state will be affected. A program of grants for public airport construction is scheduled to be initiated at about 325 airports.

President Eisenhower's budget estimates submitted to Congress disclose that estimated expenditures for construction by the Army Engineers for 1961 will reach an all-time high of $742 million. Appropriations recommended will provide for continuation of construction on 47 navigation, 98 flood control and 21 multi-purpose projects with hydro-electric power facilities, plus flood control work on the Mississippi River and tributaries.

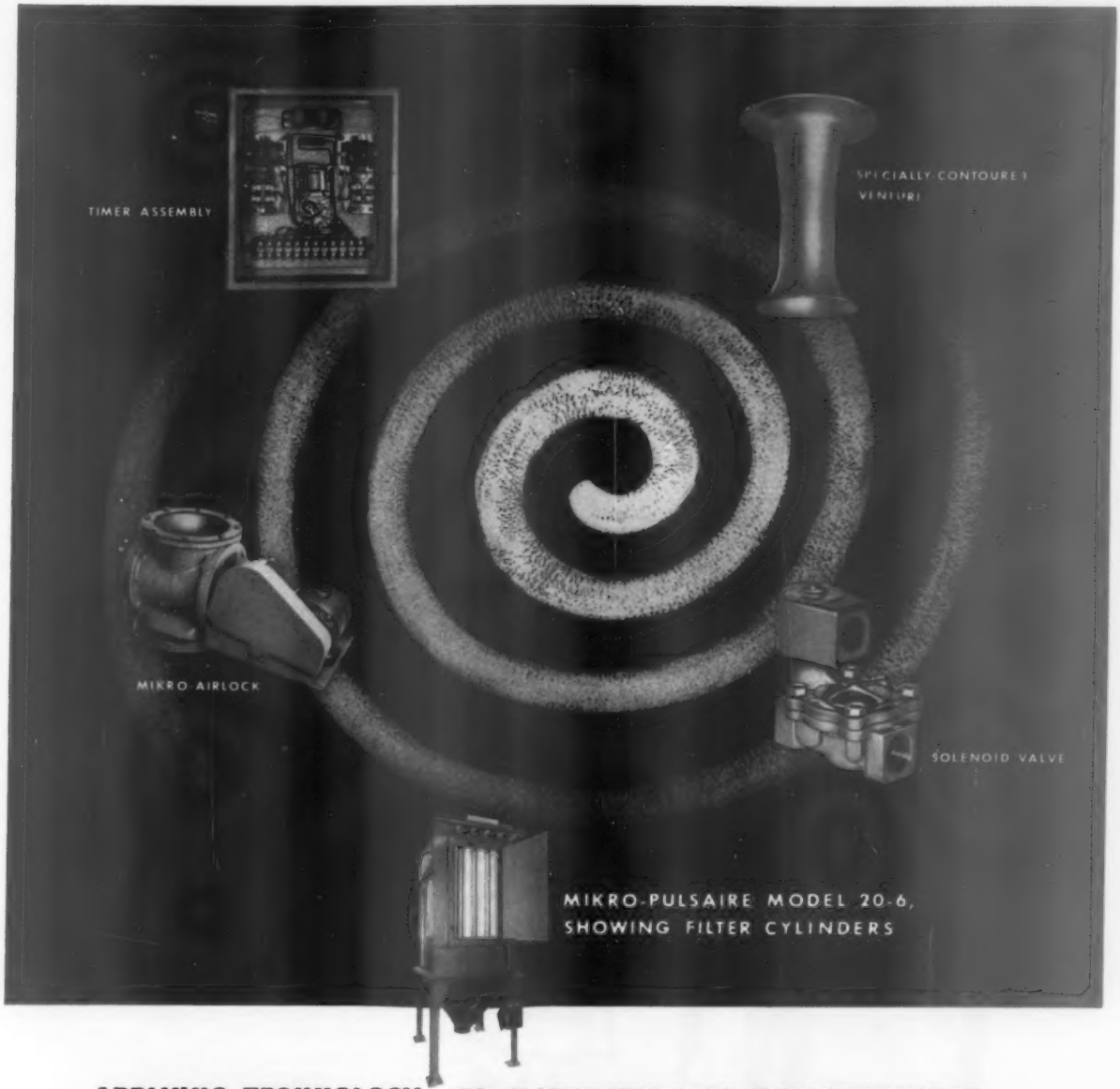
Appropriations will also include funds for 31 new starts. Construction will be completed next year on 51 projects. Of $1.3 billion to be spent in 1961 for natural resources construction programs, about nine-tenths of the amount will be applied to the control and development of rivers and streams for flood control, navigation, irrigation, hydro-electric power, municipal water supply and related purposes.

Congress has before it, a recommendation by the General Services Administration (Uncle Sam's housekeeper) to begin construction of 16 new Federal buildings, costing a total of $154 million with first year expenditures estimated at $35 million. Major national security construction for 1961 is estimated at $1.6 billion, some $279 million below 1960 and $518 million under 1959. The forthcoming program calls for additional Atlas and Titan sites, installation to support the initial deployment of Minuteman missile squadrons.

Pending bills Affect rock Products The 1960 session of Congress will be shorter than those of the past few years because of the big presidential conventions in Los Angeles (Democrats) and Chicago (Republicans) in July. During the next few months, however, the law-makers are going to have before them a series of controversial measures of interest to the rock products industries. Because of the huge national debt, the Democratic-controlled Congress will make no election-year tax cut, although a small group in both Houses favor a reduction this year.

Congress will again consider a liberal omnibus housing bill with provisions for urban renewal, public housing and loans to veterans. President Eisenhower vetoed similar bills on different occasions at the 1959 session. Congress will also consider a proposal that would provide a generous amount of funds to build classrooms for the public schools, but this bill had already encountered some stiff opposition. Many members fear the plan would lead to Federal control of the schools.

Housing Prediction The National Lumber Manufacturers Association, with offices in the Nation's Capital, predicts that total new construction contract awards in 1960 may be down a shade from 1959. The prediction is based on the belief there will be a mild decline in housing offsetting gains in other categories. President Thomas J. McHugh of Boston adds: "Still, the contract award total is expected to be at least the second highest figure on record, with the market for construction materials and services among the largest in U. S. history."



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LABOR RELATIONS

A ROUNDUP OF ACTUAL DAY-TO-DAY IN-PLANT PROBLEMS AND HOW THEY WERE HANDLED BY MANAGEMENT MEN

How would you decide?

If an employe is on layoff and his job is discontinued, is he entitled to severance pay?

What Happened: The company had a policy which provided that where an employe lost his job because a department or an operation was discontinued, he would receive from 4 to 8 weeks severance pay—depending on his seniority.

One day Jack Boland was laid off because of a lack of orders. He was on layoff for 14 months when the company decided to close the department in which Boland had worked. He claimed severance pay in accordance with established policy.

The company balked at this. It said that the layoff was not the result of a decision to discontinue the department. It was made because business was poor. The decision to close up the department entirely came so much later that the employe cannot claim that the company used the layoff to get around the severance-pay policy.

Was the company:
Right? ☐ **Wrong?** ☐

What Arbitrator Kelliher ruled: "The discontinuance of the department was evidently not contemplated at the time that the employe was laid off. In order for the laid-off employe to become eligible for severance pay, there must be a displacement from his job, and his layoff must be attributable to the decision to discontinue the operation or department. The employe is not entitled to severance pay."

Can you deny promotion to a senior man because he has a bad safety record?

What Happened: When a new job opened up, the company posted the vacancy on the bulletin board. It had a policy of granting promotions on the basis of seniority and ability. Bill Johnson put in for the higher job—he being the top-seniority man in the lower grade. When he was by-passed for the promotion he raised his voice in protest.

The company produced records to show that Johnson had two warning slips for unsafe conduct on the job. Management also said that Johnson had to be constantly reminded about observing the safety precautions.

Johnson promised to be "safe" in the future and claimed that the company couldn't use two warning slips as a basis for not promoting a man. "It's rank discrimination," he charged.

Was Johnson:
Right? ☐ **Wrong?** ☐

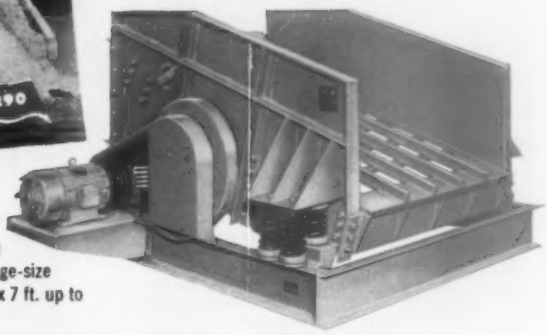
What Arbitrator Stark ruled: "Management cannot be expected to assume undue risks or to assign a man who cannot safely fulfill all the requirements of the position. The evidence clearly shows that safety was the primary and only reason for Johnson's being passed by. On the other hand, there is no evidence to show that Johnson's actions would be any different in the future. In the light of the above, the grievance is denied. The company is justified in denying the promotion to Johnson."

(Continued on page 30)

HOW TO PICK SCREENS *that pay profits*

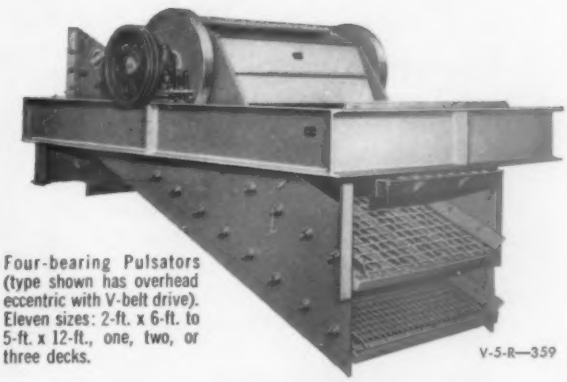
Screening aggregates is a tough job—but it can be done efficiently and at low cost—with Telsmith Vibrating Screens. This new Telsmith bulletin tells you how. It explains which type of screen is best for scalping . . . sizing . . . washing—and why Telsmith builds two types of four bearing screens and one type of two bearing screen. It describes each type; shows several new Telsmith Vibro-King features, including—new counterweight mechanism and new spring suspension, making it the smoothest and most efficient screen you can buy, either for scalping or finishing. Shows new heavy-duty tray construction; best methods for mounting screen cloth. Full of helpful pictures, diagrams and specifications.

Get this NEW BOOK FREE—Ask for No. 290



Heavy-Duty Vibrating Grizzlies, with special screen trays for handling large-size aggregate. Three sizes: from 45-in. x 7 ft. up to 54-in. x 8-ft., one and two decks.

Two-bearing Vibro-King Screens—eleven sizes: 3-ft. x 6-ft. to 5-ft. x 16-ft., one, two, or three decks.



Four-bearing Pulsators (type shown has overhead eccentric with V-belt drive). Eleven sizes: 2-ft. x 6-ft. to 5-ft. x 12-ft., one, two, or three decks.

V-5-R—359

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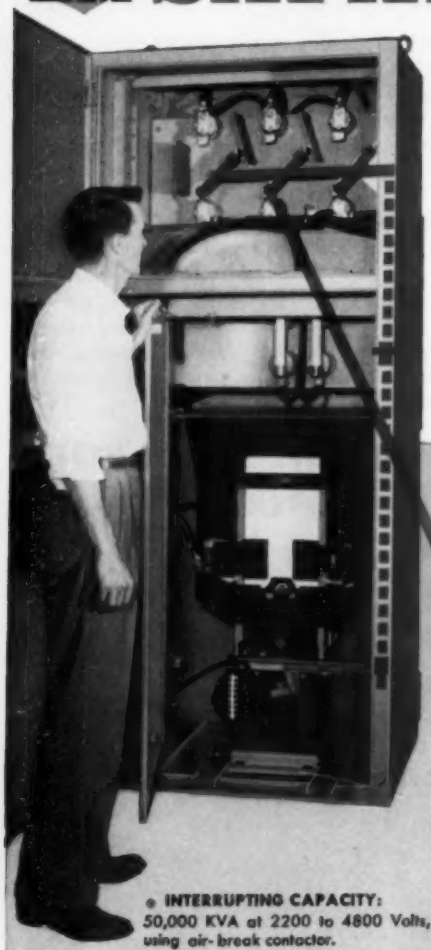

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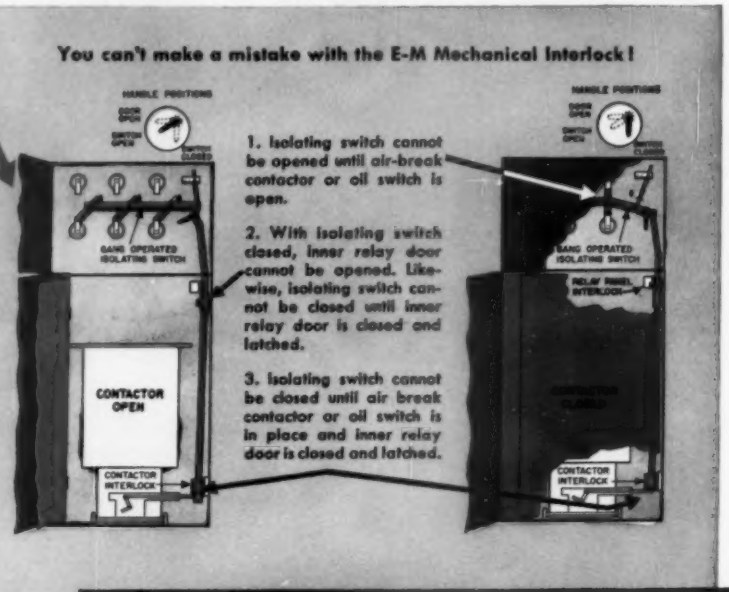
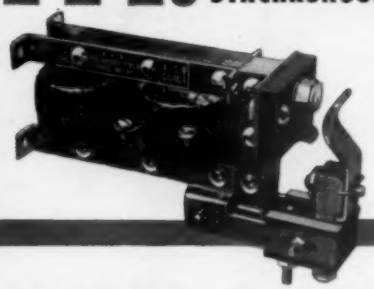
1. **Complete Personnel Safety** with a foolproof system of mechanical interlocking between gang-operated isolating switch, oil switch or air-break contactor, and compartment doors.
2. **Complete Motor And Control Protection.** Skillfully engineered and applied components are carefully coordinated to protect both motor and control over complete design range of overload and fault conditions.


You can't make a mistake with the E-M Mechanical Interlock!
1. Isolating switch cannot be opened until air-break contactor or oil switch is open.
2. With isolating switch closed, inner relay door cannot be opened. Likewise, isolating switch cannot be closed until inner relay door is closed and latched.
3. Isolating switch cannot be closed until air break contactor or oil switch is in place and inner relay door is closed and latched.
CONTACTOR OPEN
CONTACTOR INTERLOCK

E-M SAFETY-GANG ISOLATING SWITCH of SAFAIR Control is externally operated, internally interlocked as detailed in color and diagrams above, right.

SAFAIR features a 50,000 kva (NEMA Class E-1 maximum rating) air-break contactor suitable for repetitive motor starting and rapid switching in a complete line of squirrel-cage and wound-rotor induction motor controls and synchronous motor controls.

PFR* for Simple, Reliable SYNCHRONOUS MOTOR CONTROL



Safair- and Safuse-controlled synchronous motors pull into step smoothly and powerfully every time. E-M-invented *Polarized Field Frequency Relay system of synchronous motor

3300-TPA-2189

ELECTRIC MACHINERY

Originators of the safety-gang

their men and motors...

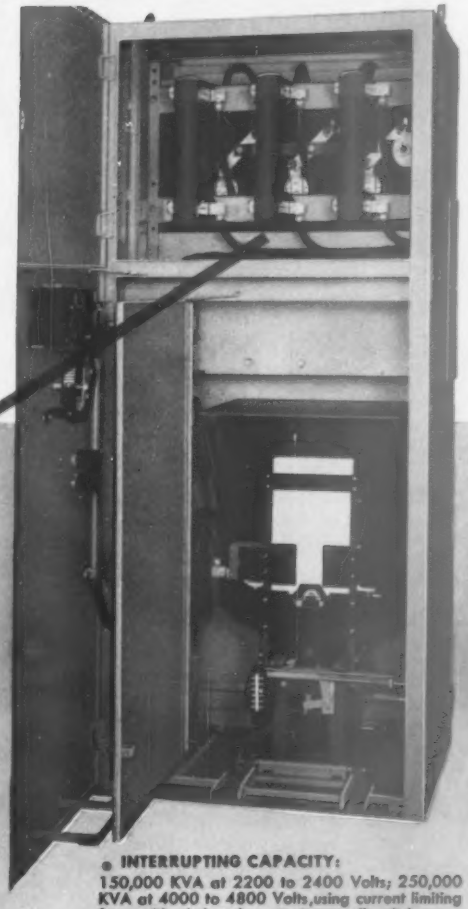
OFFER COMPLETE PROTECTION!

E-M SAFUSE Magnetic Control (NEMA CLASS E-2)

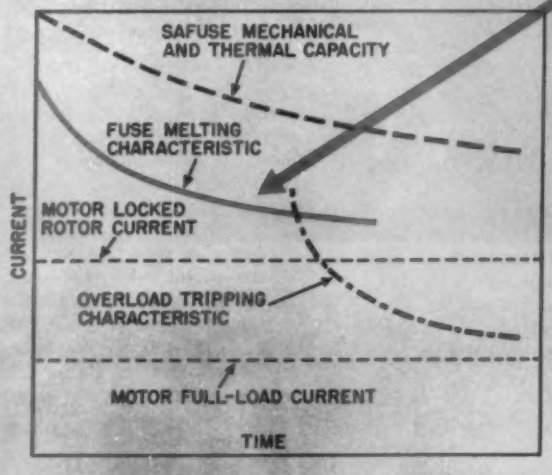
3. **Complete Front Accessibility.** Controls may be placed in rows, back-to-back or back-to-wall—no access required to back or sides.

4. **Complete Space Utilization.** Imaginative E-M engineering has provided a highly compact control design without compromise on safety or performance, and with provision to accommodate modifications.

5. **Complete Modification Line.** You can tailor the control to fit your exacting requirements—nearly 100 options and special features available.



• **INTERRUPTING CAPACITY:** 150,000 KVA at 2200 to 2400 Volts; 250,000 KVA at 4000 to 4800 Volts, using current limiting fuses with air-break contactor or oil switch.



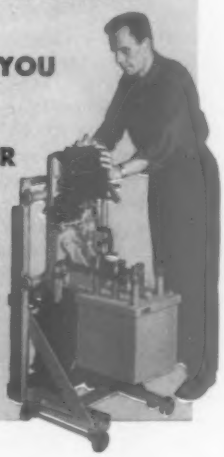
starting and synchronizing is sensitive to the electrical condition of the field winding, applying field excitation at proper rotor angle for maximum synchronizing torque with minimum current inrush . . . and it's coupled with E-M's modern field failure protective system.

FAST ACTING FUSES *plus* E-M Safety-Gang Isolating Switch in SAFUSE are the best possible combination for complete motor and control protection thru NEMA Class E-2 maximum ratings. The current limiting fuses provide short circuit protection and are carefully coordinated with overload relays as shown in diagram above.

Complete information and helpful application data are available from your E-M Field Engineer. Call him and write the factory for publications 242A and 249.

SAFUSE GIVES YOU CHOICE OF AIR-BREAK CONTACTOR OR OIL SWITCH

For highly repetitive duty use the roll-out air break contactor. But for less frequent starting—or in areas of severe dust, dirt, moisture, or corrosive fumes—the roll-out oil switch is recommended.



E-M MFG. COMPANY MINNEAPOLIS 13, MINNESOTA

disconnect high-voltage fused control

Enter 1463 on Reader Card

continued from page 26

Do you have to pay an employe if he is not given his share of overtime?

What Happened: Because of an oversight, Jack Calle was skipped on an overtime assignment. The company had a policy which provided that overtime would be "distributed equitably." Calle went to his foreman. "Bill," he said. "It was my turn to work overtime last night. You skipped me and I lost 3½ hours pay."

"I'm sorry, Jack," the foreman replied, "I slipped up. I'll make it up to you. First overtime we get in this department will be yours. Okay?"

"No, it's not okay. I want to get paid for the overtime I didn't work. I'm entitled to it."

The issue went to arbitration, and the company claimed that it didn't have to pay. Its only obligation was giving Calle a chance to make up the loss by working. "Overtime pay is for working. It can't be used to penalize an employer for an honest mistake," the company concluded.

Was the company:
Right? ☐ **Wrong?** ☐

What A Board of Arbitration ruled: "Affording an employe an opportunity to make up improperly lost hours at a later date is not an adequate remedy. He is entitled to work those hours at the time they are available, not at a later time more convenient to the employer. Furthermore, there always remains the possibility of termination of an employe between the time he is improperly denied available hours and the time when the employer decides to make additional hours available to him. The worker should be granted pay for the overtime he lost."

Can an employe be reprimanded for inefficiency even though the company has no formal production standards?

What Happened: One morning Arthur Flint found the following note in his time-card slot:

"A review of your performance record for the period of October 15-22 has been made. We find that your rate of production is far below standard. There should be a concerted effort on your part to raise the rate of your production as this condition must be corrected or you will be subject to more drastic disciplinary action."

Flint took the note to the union which decided to make an issue of this warning notice. At arbitration it put forth the following arguments:

1. The company has no formal production standards so it cannot discipline employes for not meeting quotas.
2. Employes have never received any communications from management on what's expected of them in the way of output.

The company answered:

1. We have always had production standards—not written ones, but we always know what average production is supposed to be.
2. Flint was 15 percent below average and deserved what he got.

Was the union:
Right? ☐ **Wrong?** ☐

What Arbitrator Prasow ruled: "There are generally two methods of establishing production standards—formal and informal. Production standards on a formal basis are generally arrived at through time study. Under the informal method, production standards are simply based upon past experience, production records or some rule of thumb determination. The latter method seems to apply in this case. Under this method, it would seem that the company clearly has the right to establish some standard of efficiency and to expect a certain output of each employe. This expected production then becames the production standard because it represents the amount of work expected in a given period of time from the average, qualified employe under normal conditions—with due allowance, of course, for any necessary interruptions.

"In the absence of formal determination, it seems that management is within its rights in basing its judgment of performance on production records in comparing one employe's efficiency to other workers. The company was justified in issuing the reprimand."

Can you refuse to rehire an employe on the basis of a physical examination?

What Happened: When business improved, several employes were recalled to work. However, the company insisted that each one take a physical examination. Jim Evans was found to have a "serious" case of varicose veins and was denied rehire. He grieved:

1. I've had varicose veins for 10 years, so you can't use that as an excuse for letting me out.
2. You do not have the right to subject me to a physical examination. This is a new policy and you cannot use it for old employes. You can only apply this policy to new workers.

The company disagreed:

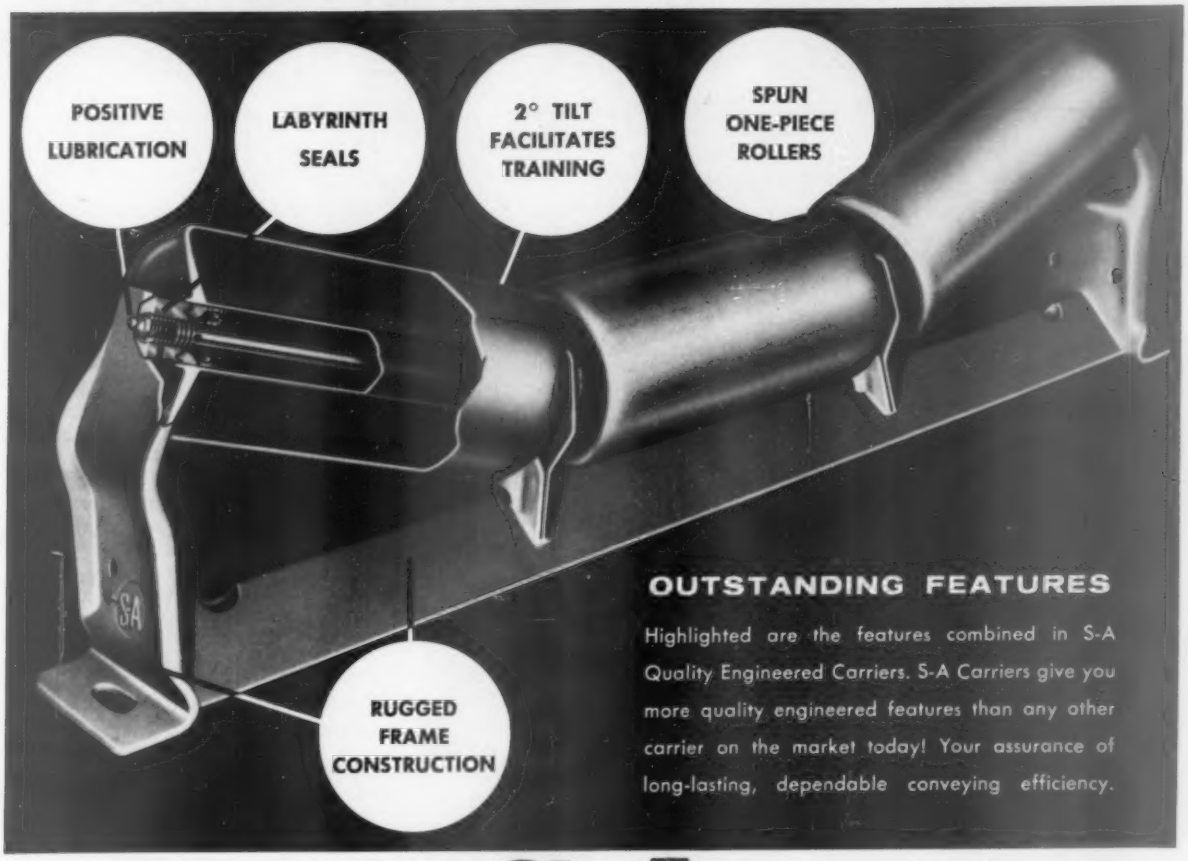
1. We can require physical exams as there is nothing in the contract to prevent us from doing it.
2. These exams are for the employes' own protection. What if a worker had developed a heart condition during layoff and didn't know it?

Was the company:
Right? ☐ **Wrong?** ☐

What Arbitrator Hogan ruled: "The company may give physical examinations to employes on their return from extended layoffs, as in this case, but the results may not be used to deprive employes of their jobs where (1) the work was satisfactory prior to layoff, (2) the physical defect was present at the time of layoff, (3) no deterioration of the ailment is shown, and (4) no clear and present hazard is shown. Evans is to be reinstated."

END

MORE PROFIT PER TON FOR YEARS TO COME!



OUTSTANDING FEATURES

Highlighted are the features combined in S-A Quality Engineered Carriers. S-A Carriers give you more quality engineered features than any other carrier on the market today! Your assurance of long-lasting, dependable conveying efficiency.

STEPHENS-ADAMSON

Quality Engineered CARRIERS

Maximum conveying efficiency and profitable bulk handling over the belt depends on what's under the belt in quality-engineered conveyor components. No single component has a greater bearing on conveyor performance than the carriers, carrying the load. The combination of features you see highlighted in the cutaway view above, are available in no other carrier on the market. The result is smooth performance, simplified and reduced maintenance, longer carrier life and less handling cost per ton. STEPHENS-ADAMSON Carriers are available in a wide range of sizes in both ball and roller bearing carriers . . . stocked for immediate delivery.

WRITE FOR CARRIER BULLETIN 355
WRITE FOR PULLEY BULLETIN 558

20° Ball Bearing Carriers—designed for years of service under rugged operating conditions.

Rubber Disc or Pneumatic "Impact" Carriers for use under loading spouts in belt or shuttle conveyors, or feeders to cushion the lumps.

"Curve Crown" Pulleys — S-A exclusive CURVE CROWN PULLEY design and SQUEEZELOCK HUB assure maximum belt training effect, gripping power for full torque transmission, minimum belt stretch and wear.

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MATERIALS HANDLING PRODUCTS
SPEEDWALK® PASSENGER CONVEYORS
SEALMASTER® BALL BEARING UNITS
SPHERCO® BEARINGS & ROD ENDS

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PEOPLE IN THE NEWS

H. Ripley Schemm elected president of Huron

H. RIPLEY SCHEMM (left) recently became the fourth president of Huron Portland Cement Co., Detroit, Mich., succeeding Paul H. Townsend (right) who has retired but will continue as chairman of the board and as a director of National Gypsum Co., of which Huron is a subsidiary.

Mr. Schemm, formerly executive vice president, was born in Saginaw, Mich., and is a graduate of the University of Michigan with a BS degree in civil engineering. He has been assistant to Mr. Townsend since he joined the company in 1925. In 1942 Mr. Schemm was named assistant general manager, was appointed vice president in charge of operations in 1949 and elected to the board of directors in 1953. Following purchase of Huron by National Gypsum Co. in 1959, he was elected executive vice president.

Mr. Townsend was born at Townsend's Inlet, N.J., and is a graduate of Yale University. He joined Huron in 1920 and was appointed vice president and general manager in 1939. Three years later he was named general supervisor over all manufacturing, sales and accounting. Mr. Townsend was elected to the board of directors in 1944 and made president in 1953.

American Cyanamid names assistant manager

MAYWOOD W. CHESSON, JR. has been appointed assistant manager of the Brewster, Fla., phosphate operations of American Cyanamid Co., New York, N.Y. He has been assistant to the manager since February 1959. Mr. Chesson has been associated with American Cyanamid since 1947, serving successfully as process engineer, mining shift supervisor, assistant mine superintendent and assistant general mining superintendent. He was named triple superphosphate manager in 1956, and three years later became assistant to the manager of the phosphate operations, which position he held until he was named assistant to the manager, phosphate operations.

Mr. Chesson studied at the College of William and Mary, and received his degree in chemical engineering from Georgia Institute of Technology. He is presently serving as chairman of the Florida section of the American Institute of Mining, Metallurgical and Petroleum Engineers.

Beukema named head of mining division

CHRISTIAN F. BEUKEMA, who for the past five years has been president of the Michigan Limestone Div. of U. S. Steel Corp., Detroit, Mich., has been appointed president of the Oliver Mining Div., Duluth, Minn. Carl G. Hogberg, vice president, has been named to succeed Mr. Beukema as president of the limestone division. Mr. Beukema, a graduate civil engineer of Michigan State University, began his career with U. S. Steel in maintenance and construction engineering at the Calcite, Mich., plant of Michigan Limestone Co., Rogers City, Mich.

MacDonald and Waldthausen elected to AMC committee

JOHN C. MACDONALD, resident manager, Nevada, Arizona, U. S. Lime Products Division, The Flintkote Co., New York, N.Y., has been appointed chairman of the Trips Committee of the American Mining Congress, and H. L. Waldthausen, works manager, Blue Diamond Division, has been named vice chairman of the committee. John C. Kinnear, Jr. is chairman of AMC's Western Division. Plans are being made for the 1960 Metal Mining and Industrial Minerals convention and exposition which will be held in Las Vegas, Nev., October 10-13.

(Continued on page 36)

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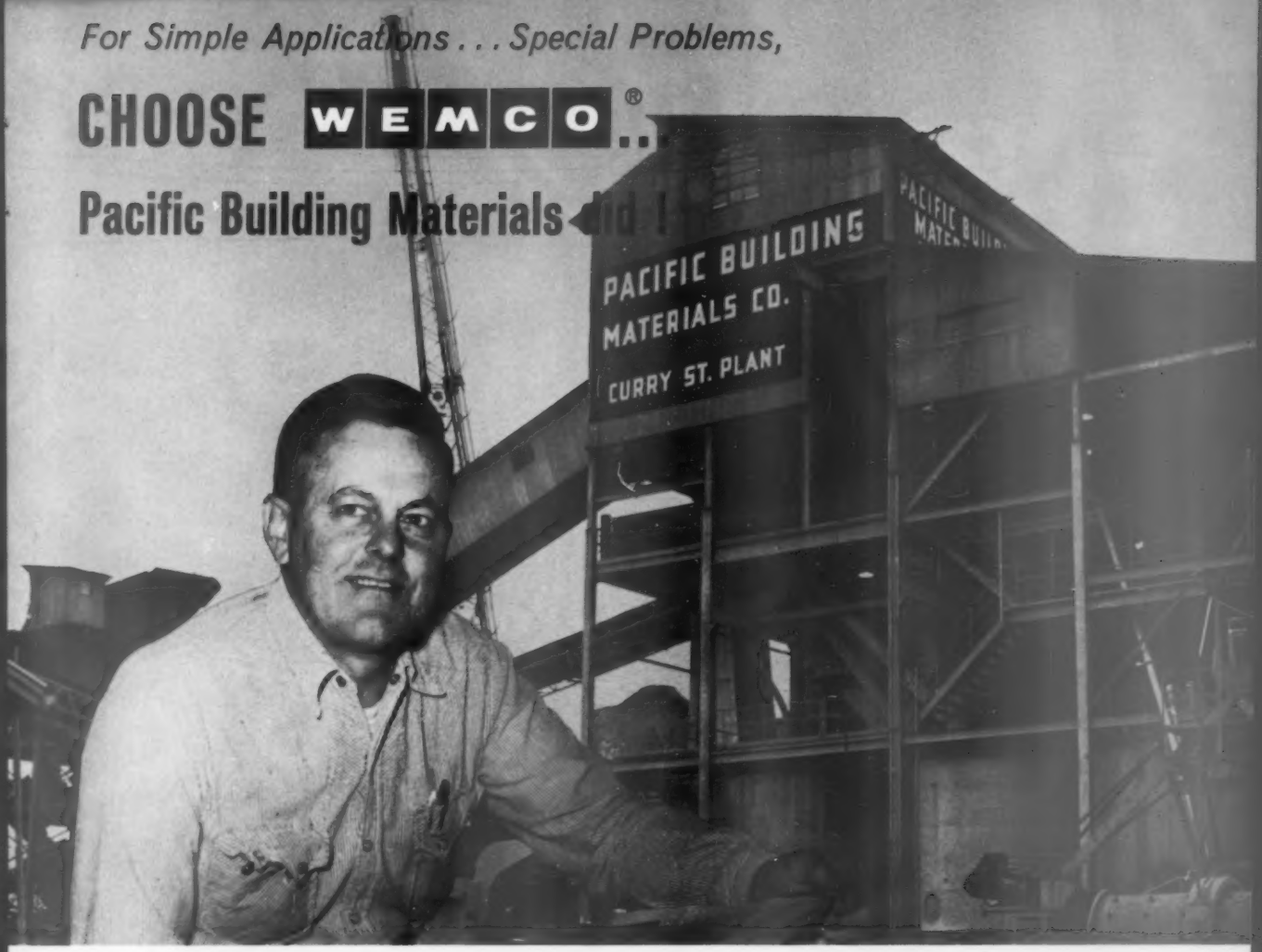
For Simple Applications . . . Special Problems,

CHOOSE WEMCO®..

Pacific Building Materials did!



Howard Hamlin, Plant Superintendent at Pacific Building Materials Division of Glacier Sand and Gravel Company, Portland, says:

"Our five WEMCO Sand Prep Machines, with their low maintenance and lack of mechanical trouble, play an important part in the over-all efficiency of our Curry Street Plant. Repairs and maintenance on the five machines we have here, plus three at other locations, have totaled less than $100 per year average during their eight years of operation. Per machine, this amounts to less than $12 per year."

The Curry Street Plant of Pacific Building Materials is designed to furnish all sizes and blends of sand required in the Portland area. Treating the varying gradation of sand dredged from the Willamette River requires the utmost in flexibility and efficiency. Only the WEMCO Sand-Prep combines all of these requirements. Part of these outstanding characteristics are: slow spiral speed . . . multiple pitch spirals . . . large and quiescent pool . . . and over-all sturdy design and construction . . . plus L/D*, of course.

Whatever your sand-sizing problems, WEMCO equipment will produce a better end result at lower cost. Why not follow Mr. Hamlin's recommendation and find out more about these products? Your nearest WEMCO representative is fully qualified to give you complete information and assistance in all your aggregate treating problems.

WEMCO®

a division of
Western Machinery Company
650 Fifth Street, San Francisco 7, California
Distributors throughout the world

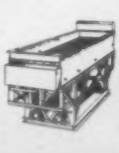
THE WEMCO LINE OF QUALITY MACHINES FOR PROFITABLE AGGREGATE PROCESSING

*SAND-PREP WITH EXCLUSIVE LIFTING DEVICE

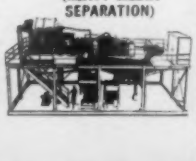
SAND-SORT

SAND-CLONE

ROCK & SAND JIGS

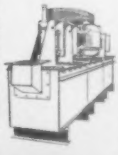


MOBIL-MILL (HEAVY MEDIA SEPARATION)



SAND-SIZER

SAND-SCRUBBER



PUMPS

engine power
BY CATERPILLAR

Over-all view of Baulne, Inc., plant set up near Weston, Oregon. Plant is shown here producing rock for another contractor on two highway jobs for Oregon Highway Department. The jobs are on the state secondary system and total eight miles.

W. E. Webster (left), superintendent of Baulne plant, discusses the more efficient operation since they repowered electrically, with E. H. Carlson of Byrne Machinery who sold the Cat D397 Electric Set.

BAULNE, INC., REPOWERS WITH CATERPILLAR ELECTRIC SETS... CUTS OPERATING COSTS AND SET-UP TIME

When Baulne, Inc., of Spokane, Washington, decided it was more economical to repower electrically than continue to use mechanical power at its rock crushing plant, a Caterpillar D397 Electric Set was the first choice. W. E. Webster, superintendent of the company's plant near Weston, Oregon, gave good reason for wanting Caterpillar: "I've been working around Cat Engines since I was a kid. I like the Cat Engines best. They stand up better—they're made better. They've worked better on the jobs I've been on. Dealer service has been good."

To meet the demands for 236,000 tons of rock for base course, top course and plant mix paving on two Oregon Highway Department jobs, Baulne, Inc., produces an average of 260 tons an hour of 1½ inch minus base course rock—maximum production is 290 tons.

Operating expenses can bite heavily into the profits of a high production operation like this one, especially when they include maintenance of several engines and their high fuel costs. With a Caterpillar Electric Set, you not only eliminate these costs but also the maintenance costs of cross shafts, jack shafts and other mechanical power transmitters that slice into your earnings and decrease plant portability.

In addition, you increase your profits through operational savings and get paid for *all* you crush by repowering with Cat Electric Sets.

When you control the rate of feed to your screens from a central location, you can vary the feed to the maximum amount that the screens will handle. In this way, you get full production of whatever material you are crushing, regardless of size, moisture content or density.

Each application for Diesel Engines has special requirements. Your Caterpillar Dealer provides more than 125 engine configurations or he can tailor one to suit you. Ask him to outline the kind of plant you'd have with a Cat Engine. He has one that will give you direct-from-the-flywheel mechanical drive, with a large capacity front-mounted generator for your electrical load . . . the Cat "Two-Handed" Diesel. Nine basic Cat Engines from 50 to over 730 HP and Electric Sets from 30 to over 350 KW—plus all of the engineering data you need to plan the most profitable installation—are available. Call him today.

This is where electrical controls pay off for Baulne, Inc. By equipping the delivery conveyor with an electric motor and controlling it by a switch actuated by a scale beam or by an operator, instantaneous stoppage of belt is obtained, resulting in exact payloads.

Cat D397 Electric Set mounted in trailer parked in off-plant location. Vibration and much of dust can be eliminated with this plan. Dry-type air cleaner of Cat Engines removes 99.8 per cent of airborne dust every hour of service. In heavy dust, pre-cleaner can be used.

CATERPILLAR

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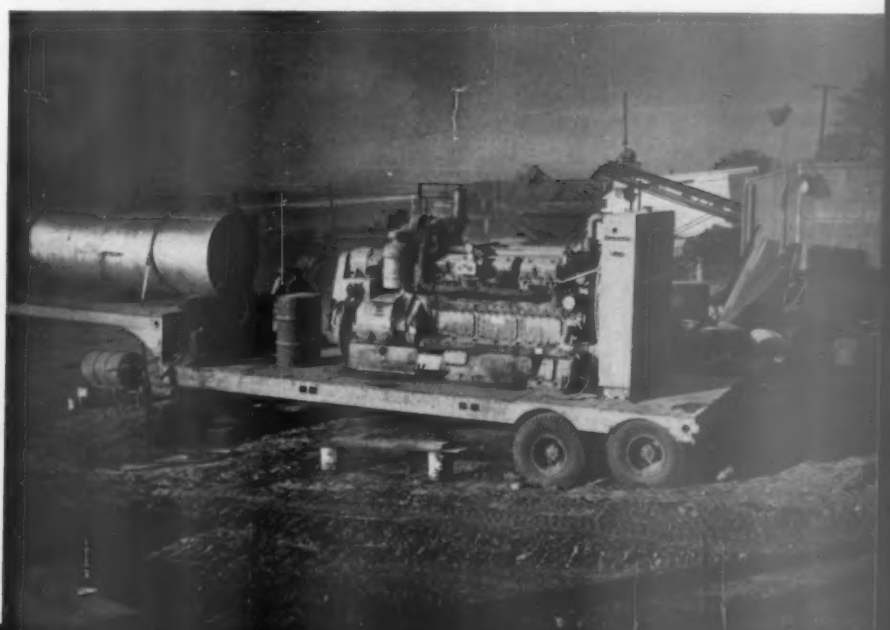
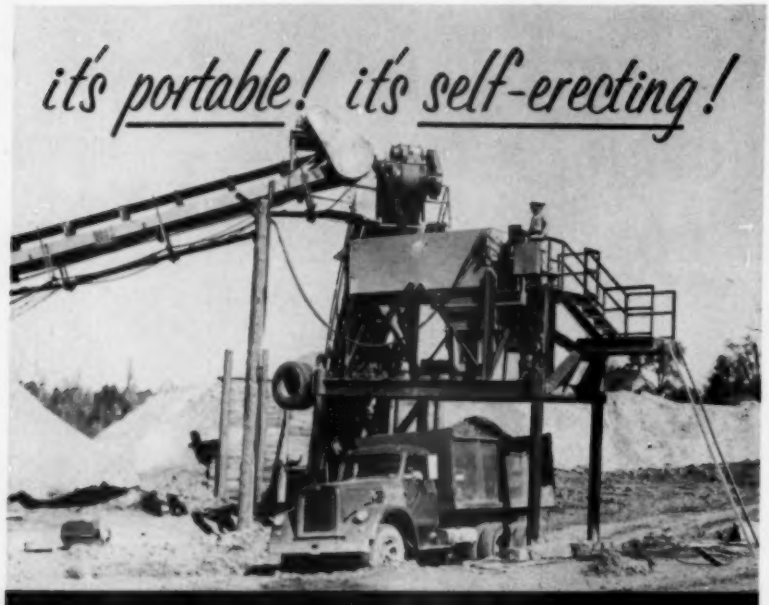
Engine Division, Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

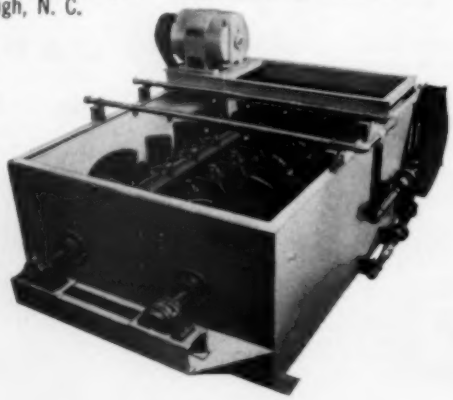




NEW Eagle Stabilized Road Base Mixer

Where mobility is required to keep the stabilized road base preparation plant close to construction sites, the Eagle Portable Base Mixing Unit is the answer. Semi-tractor positions the unit at the site. Then, hydraulically operated hoisting system quickly raises the entire unit to provide 9' clearance beneath the discharge gate of the 5 cubic yard bin beneath the mixer. Safety locking pins are then inserted in the four columns. Self-contained power unit—either electric motor or combustion engine—and V-belt drive. Totally enclosed gear drive runs in oil bath. Unit quickly made ready for travel. Thorough mixing provided of any road base materials. Stabilizing additives completely blended. Spray bars and flow meter provide addition of water in pre-determined amounts. Capacities: 125 to 900 tph. Eagle Portable Mixer shown is doing splendid job for Superior Stone Division of American-Marietta Co., Raleigh, N. C.

Eagle ECONO-MIXER with open bevel gear drive available for installation above storage bin or hopper in stationary set-up. Cast Ni-Hard paddles mounted on large diameter tubular steel shafts. Never before has such thorough mixing been available at such low cost per ton in such a sturdy "years-of-service" unit.



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PEOPLE IN THE NEWS

(Continued from page 32)

Marblehead's chairman dies

Wallace E. Wing, chairman of the board of Marblehead Lime Co., Chicago, Ill., died February 19 after an illness of several weeks. He was 62.

Mr. Wing became associated with Marblehead Lime Co. in 1922 after graduation as a chemical engineer from Ohio State University. He established laboratories at several of the company's plants and became director of research and later director of operations. In 1944 Mr. Wing was elected president and in 1956 became chairman of the board and chief operating officer. Mr. Wing was an active member of the National Lime Association, serving as president from 1948 to 1951. He was also active in the American Society for Testing Materials and the American Chemical Society.

National Gypsum promotions

C. REX MORGAN has been appointed manager of the Lorain, Ohio, plant of National Gypsum Co., Buffalo, N.Y. He was formerly manager of the Portsmouth, N.H., plant and will be succeeded by Marvin C. Grisham, who has been production superintendent of the Bronx, N.Y., plant.

John P. Hayes has been promoted to manager of the Midwest sales division, succeeding Jay P. Nicely who was recently appointed dealer sales manager at Buffalo, N.Y.

Joseph Des Marais has been named manager of the Indianapolis district. He was formerly assistant district manager at Minneapolis.

(Continued on page 41)

Where heavyweights move job records prove...

FIRESTONES PULL HAUL COSTS DOWN!

Take a tip from nationwide construction records—Firestones lower tire costs per job! Here's why: Firestone off-the-highway tire dependability plus Firestone's Giant Tire Service keeps expensive equipment on the job and *working*. Firestones are built with Firestone Rubber-X, the longest-wearing rubber ever used in Firestone tires. Firestone Shock-Fortified nylon cord is a natural for off-highway loads—holds impact damage to the minimum. And your Firestone Tire Expert will help you match tires to the job as well as handle all maintenance problems. Turn downtime into worktime with Firestone tires and service! Call your Firestone Dealer or Store today.

WHEN ORDERING NEW EQUIPMENT ALWAYS SPECIFY FIRESTONE TIRES

TUBELESS OR TUBED

Super Rock Grip Wide Base* Super Rock Grip Deep Tread*

Firestone

BETTER RUBBER FROM START TO FINISH

Copyright 1960, The Firestone Tire & Rubber Co.

*Firestone T.M.

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"We particularly like the snappy action and control accuracy of the TD-25's front-mounted winch," report the Walls Brothers, Wolf Ridge Coal Co. Their "25" has a key job, helping strip 35-ft. earth, shale and sand rock overburden from a 4-ft. seam of coal.

"THIS NEW TD-25 REALLY HAS IT for overburden stripping"

C. M. and Reid Walls,

"We have had eight years of fine service using International TD-24's," report the Walls Brothers, for Wolf Ridge Coal Company. "Our faster and easier starting new TD-25 really has it for mountain overburden stripping operations.

"The '25's' turbocharged diesel engine governs instantly to load increases, giving the power to carry full blade loads right on through without lug-down. The TD-24's, and now the TD-25 have proved to us that the live power-turning feature moves more overburden, and gives top operating safety."

Of all king-sized crawlers, only the new 230-hp International TD-25 has Planet Power-steering. This

Another duty of the TD-25—shattering coal with the two-standard Ateco ripper to size the coal and speed load-out. "We've used International TD-24's since '51 with continuous operation, good service, minimum repairs," add the Walls Brothers.

Wolf Ridge Coal Co., Oliver Springs, Tennessee

is the only planetary system engineered and located to give you the dual advantages of "live track" power-steering; plus on-the-go, Hi-Lo power-shifting that does away with steering clutches.

Planet Power-steering eliminates load-limiting "dead-track drag"—gives you full-load pull-power on turns as well as straightaways. And Hi-Lo power-shifting does away with time-wasting "gear-shift lag"—gives on-the-go matching of power to load, for full-speed cycles.

Rip-snorting turbocharged power

Press the direct-start button, to command the "25's" rip-snorting, free-breathing diesel horsepower! Dual valving of the "25's" high-torque DT-817 engine provides for peak turbocharging efficiency—to deliver full-rated performance from sea level to timberline!

Prove what it means in bonus capacity to get the double-barreled advantages of power-steering and power-shifting—in a finger-tip-controlled crawler with DT-817 diesel wallop! Measure the extra value of getting years-proved Planet Power-steering (along with Hi-Lo power-shifting) as designed-in, built-in basic standard equipment. Compare performance—see what's behind TD-25 ability to outearn king-sized clutch-steered crawlers up to 50% on overburden removal, land-clearing, high-walling and other tough mine and quarry jobs. Let your International Construction Equipment Distributor demonstrate!

Here's your 76-page cost and production estimating book—newest, most authentic and complete guide for estimating material-moving costs—and for selecting equipment combinations for top profits, anywhere! Yours for the asking from your International Construction Equipment Distributor!

International® Construction Equipment

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Illinois
A COMPLETE POWER PACKAGE

You know the Bucyrus-Erie 40-R and 50-R

NOW MEET THE TOUGH KID BROTHER

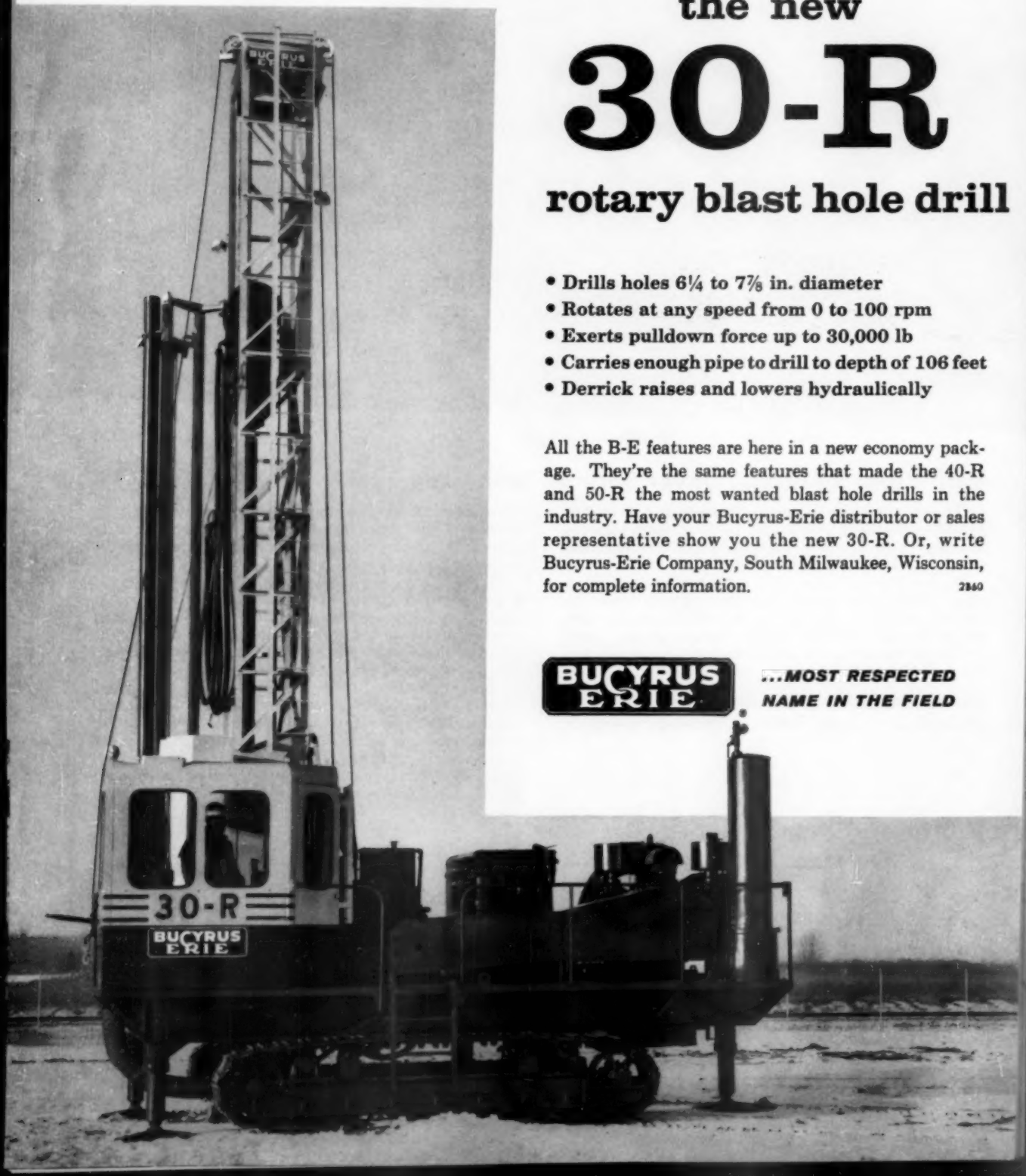
the new

30-R

rotary blast hole drill

- **Drills holes 6¼ to 7⅞ in. diameter**
- **Rotates at any speed from 0 to 100 rpm**
- **Exerts pulldown force up to 30,000 lb**
- **Carries enough pipe to drill to depth of 106 feet**
- **Derrick raises and lowers hydraulically**

All the B-E features are here in a new economy package. They're the same features that made the 40-R and 50-R the most wanted blast hole drills in the industry. Have your Bucyrus-Erie distributor or sales representative show you the new 30-R. Or, write Bucyrus-Erie Company, South Milwaukee, Wisconsin, for complete information. 2B40



BUCYRUS ERIE

...MOST RESPECTED NAME IN THE FIELD

(Continued from page 36)

Harley Fleming heads cement plant of Texas Industries

HARLEY FLEMING has been named superintendent of the new cement plant of Texas Industries, Inc., now under construction at Midlothian, Texas, according to an announcement by Ralph B. Rogers, president. For the last 13 years Mr. Fleming has been production manager of Ideal Cement Company's Southern division at Houston. Previously he was plant manager at Ideal's Houston plant and assistant plant manager at Mobile.

Medusa names Fort as finance vice president

ROBERT W. FORT has been elected vice president-finance of Medusa Portland Cement Co., Cleveland Heights, Ohio. He was formerly assistant vice president and succeeds P. G. Dawson who is retiring after 47 years.

Mr. Fort is a graduate of the University of the South, Sewanee, Tenn., and received his MS degree in business administration from Harvard Business School. He is a director of the Cleveland Control of the Controllers' Institute.

Mr. Dawson, a native of Manistee, Mich., joined Medusa (the former Newaygo Portland Cement Co.) in 1913. In 1929 he was elected secretary, and in 1936 became vice president and treasurer. He continues as a director of the company.

(Continued on page 44)

ANOTHER FLEXCO SPLICE DOING A DEPENDABLE JOB AT *MATERIAL SERVICE CORP.*

Picture courtesy of Material Service Corp., Yard #15, Lockport, Ill.

Cutaway of a Flexco application showing compression plates, teeth and precision-made bolts and nuts.

Belt maintenance crews like to work with Flexco fasteners because they are easy to apply — joints last a long time — worn plates can be replaced quickly — ideal for repairing rips and tears.

PROTECT YOUR INVESTMENT IN CONVEYOR BELTS WITH FLEXCO . . . The quality fastener for all heavy-duty conveyor belt applications: SAND & GRAVEL, CRUSHED ROCK, COAL & METALS, CONSTRUCTION EQUIPMENT, etc.

Available in Steel, Monel, Stainless, Everdur. Also Promal top plates.

NEW "25-PAK"

"25-PAK" contains enough fasteners to join common belt widths.

ORDER FROM YOUR DISTRIBUTOR, OR WRITE TO US FOR BULLETIN F-112.

"FOR THE SPLICE OF A LIFETIME"

Flexible STEEL LACING COMPANY

4684 LEXINGTON STREET • CHICAGO 44, ILLINOIS

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Enter 1404 on Reader Card

CEDARAPIDS Portable-Stationary Combination MEETS INTERSTATE 80 SPECIFICATIONS

Portable plant setup helps Schildberg Construction complete a million ton crushing contract two months ahead of schedule!

When work started on Iowa's Interstate 80 west of Des Moines, Schildberg Construction Company of Greenfield, Iowa, had the contract to supply 1,145,328 tons of specification aggregate to the four prime contractors on the job. The job was scheduled for completion in 7½ months.

A big order! But Schildberg solved it in 5½ months with one of the Midwest's most productive spreads of Cedarapids Portable Plants combined with a stationary Double Impeller Impact Breaker, which poured out material at a 1,000 ton-per-hour clip. The contract called for 622,517 tons of rolled stone base and 522,811 tons of granular subbase.

To meet contractor schedules for laying around 14,000 tons of aggregate on the road per day, enormous stockpiles had to be built up. Specifications called for crushing 90% of the quarried limestone to 1" minus, and to add 8% to 10% moisture to obtain optimum moisture content. Cold weather and heavy snow prevented going into full production until the middle of May. By September 15 the contract was completed, "and we had some overrun to boot," commented Mr. Schildberg.

In addition, this plant supplied another 100,000 tons of aggregate to another contractor for work on state highway 25. With other Cedarapids portable plants in three quarries helping to boost total output for the year to well over 2 million tons of aggregate and aglime, not one of Schildberg's regular customer deliveries was delayed. Not once did any of the Interstate contractors have to wait for material.

Mr. Schildberg's philosophy is "Production and quality are the key to success." That's why he depends on the quality engineering and high production of Cedarapids equipment to handle every job, from Interstate work to drive-in aglime trade, profitably.

Ask your Cedarapids Dealer to show you how to get lowest cost per ton with Cedarapids engineered stationary plants, portable plants, or a combination of both. Call him today.

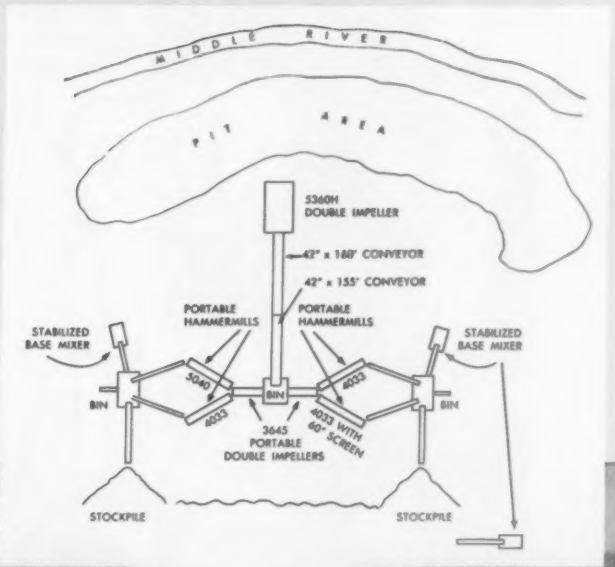
IOWA MANUFACTURING CO.

Cedar Rapids, Iowa

averages 10,000 TONS of aggregate per day

"T" arrangement of crushing equipment prevents bottlenecks

Schildberg's efficient "T" layout eliminated truck traffic jams and assured the most efficient flow of material through the plant. A Cedarapids stationary 5360H Double Impeller Impact Breaker at the base of the T stem served as the primary crusher feeding two Portable 3645 Double Impellers from a 100-ton surge bin. From this point, the material flowed out both arms of the T through two Portable Hammermill Crushing and Screening Plants on each side for final reduction and grading. Aggregate was then conveyed to 50-yd. bins at each end of the T arms, where it was fed either to Cedarapids Stabilized Base Mixers for obtaining proper moisture content, or diverted to trucks for stockpiling. A third Stabilized Base Mixer was located at the end of the stockpile.



Norblo

Automatic Bag Type Dust Arresters

For efficient low-cost dust and fume collection for years to come

With Norblo automatic cyclic bag shaking and cleaning, the fume or dust filtering capacity of the multiple cylindrical bag system is maintained continuously at high levels. The cleaning cycle lasts only a few seconds for each compartment — only three or four minutes out of each hour for *an entire unit.*

Thus Norblo Automatic Bag Type Fume and Dust Collection provides low-cost, continuous heavy duty service of high efficiency. Sound engineering design, almost fifty years' experience, and complete fabrication in Norblo shops assure you guaranteed performance at low operating and maintenance costs. Ask your consultant or write for Bulletin 164.

buell Norblo

Buell Engineering Company, Inc.
Northern Blower Division
6409 Barberton Ave., Cleveland 2, Ohio • OLympic 1-1300

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PEOPLE IN THE NEWS

(Continued from page 41)

George Cobb appointed works manager for Columbia Cement

GEORGE L. COBB has been named works manager for the Zanesville, Ohio, plant of the Columbia Cement Corp. He succeeds the late Walter K. Farst who had served as vice president of operations and general manager of Columbia Cement Corp., a wholly-owned subsidiary of Columbia-Southern Chemical Corp., Pittsburgh, Pa. Mr. Cobb was formerly chief engineer of the company's Natrium, W. Va., chemical plant, which he joined as a maintenance engineer in 1946, promoted to maintenance superintendent in 1948 and chief engineer in 1952.

OBITUARIES

Stanley W. Tuttle, vice president and secretary of the International Talc Co., Inc., Gouverneur, N.Y., died January 16. He was 67 years old.

Horace Vernon Goodrich, vice president of the Pacific Rock and Gravel Co., Arcadia, Calif., died December 22 at the age of 79. Born in Pendleton, Ind., Mr. Goodrich had lived in California for 54 years.

Fred P. Diener, director of research, Universal Atlas Cement Div., United States Steel Corp., New York, N.Y., died suddenly on January 12 at his home in Eastchester, N.Y. He was 61 years old. Considered one of the top authorities on the technology of cement and concrete uses, Mr. Diener served for many years as a member of Committee C-1 on Cement, American Society for Testing Materials, and as a member of the General Technical Committee of the Portland Cement Association. He was also a member of the American Concrete Institute, Concrete Industry Board, and Highway Research Board of National Research Council.

Born in Allentown, Pa., Mr. Diener was graduated from Lehigh University with a degree in chemical engineering. He joined Universal Atlas in 1924 as special chemist at the Northampton, Pa., plant, and in 1930 became assistant chief chemist. In 1941, he was promoted to assistant general chemist at New York City and two years later was named chemical engineer. Mr. Diener has been director of research since 1952.

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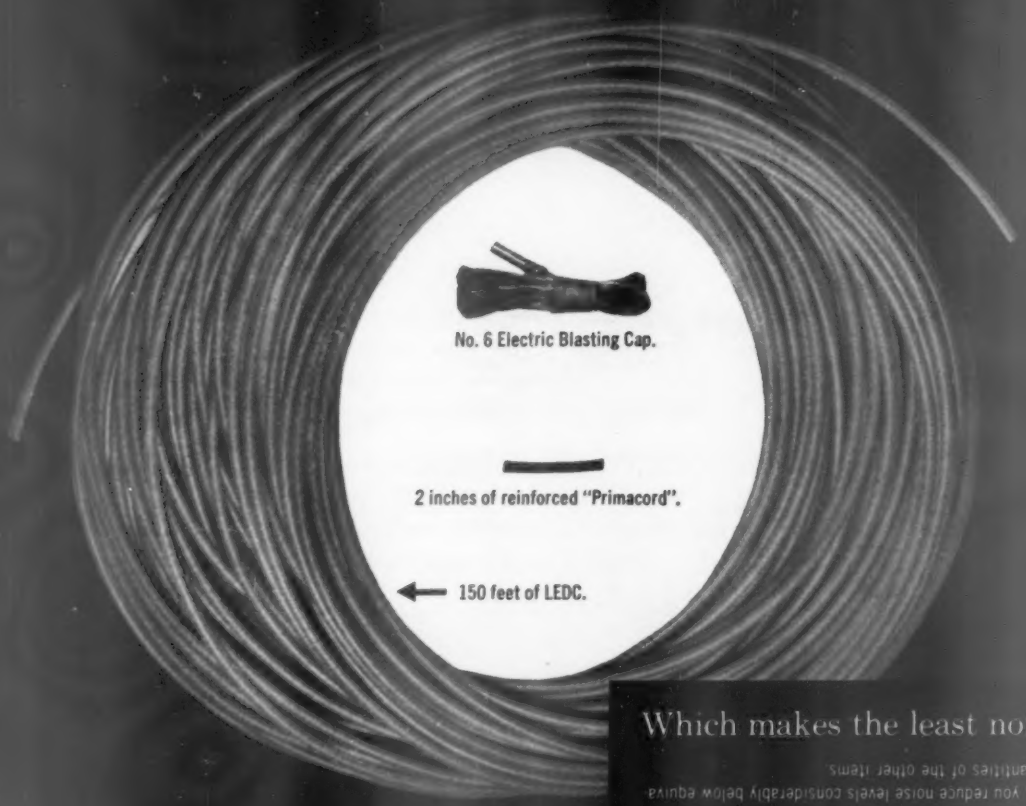


Which makes the least noise?

Answer: All three items produce the same amount of noise. Thus when you use the low noise level trunk line blasting system, you reduce noise levels considerably below equivalent quantities of the other items.

Shhhh!

New Du Pont delay blasting system* hushes the noise of quarry, open pit and strip mine blasting

If you have been burying your "Primacord" trunk lines, or have reluctantly switched to electric blasting caps in order to reduce the noise level of your blasting, here's good news.

Reduces noise The new Du Pont Low Noise Level Trunk Line Delay Blasting System* uses LEDC (Low Energy Detonating Cord) developed by the Ensign-Bickford Company in a cooperative program with Du Pont. It muffles the noise without the nuisance and expense of burying the cord. 150 feet of LEDC makes no more noise than one electric blasting cap!—or 2 inches of ordinary "Primacord"!

2 grains per foot This low noise level trunk line system contains only 2 grains of explosives per foot, as contrasted to 50 grains per foot in the regular "Primacord." It is this tiny load that keeps the noise level down. Our customers report noise and vibration complaints from neighboring residents were actually eliminated, when LEDC trunk lines were recently introduced.

Other features This system uses trunk line delay connectors, available in intervals of 10, 15 and 25 milliseconds. You can select the interval best suited to your particular blasting problem. The low noise level trunk line delay blasting system provides an unlimited number of periods at intervals of 10, 15 or 25 milliseconds. And at no time is it ever necessary to place a blasting cap in the borehole.

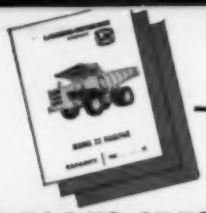
Available now Your Du Pont distributor or representative can help you reduce your noise problem with new LEDC at once, or answer your questions about it. Call him. Or write Du Pont, Explosives Department, 6440 Nemours Bldg., Wilmington 98, Del.

**Patent applied for*

DU PONT EXPLOSIVES

REG. U. S. PAT. OFF.

Better Things for Better Living . . . *through Chemistry*



—— Make a "spec check"...

Compare Haulpak® ... see how

LW engineers "threw away the book" when they designed the new Haulpak off-road hauler ... for *your* benefit. Some of the exclusive features that resulted are shown here. They are advantages that help you move *more* tonnage, *faster*, at *lower* net cost per ton.

To see what this advanced design approach means to Haulpak, check its specifications. You'll want "spec sheets" in your files anyway, and your LW Distributor can supply you copies. Then, with basic Haulpak facts handy, compare them to *other* off-road haulers.

WHAT YOU WILL FIND WHEN YOU COMPARE HAULPAK:

(Competitive hauler specifications are "averaged out" for simplicity purposes ... but Haulpak superiority is just as clear over any *single* machine.)

WHAT TO COMPARE	Off-road Haulers 20-30-ton class		Off-road Haulers 30-40-ton class		HOW YOU BENEFIT
	Average*	Haulpak LW 27	Average*	Haulpak LW 32	
Length Wheelbase Turn Diameter	26'7" 14'4" 64'3"	23'10" 10'10" 44' 6"	31'5" 16'7" 77'6"	23'10" 10'10" 44' 6"	*HAULPAK is shorter.* You maneuver faster, quicker and in less space.
Top Speed (in mph)	30.7	35.4	25.2	38.8	*HAULPAK is faster,* for more cycles per hour, more tonnage per shift.
Empty Weight (in lb)	49,300	43,020	73,400	44,950	*HAULPAK is lighter,* for more payload weight, less "dead" weight.
Ground Clearance Front Axle Rear Axle	16" 16"	25" 20"	17¼" 18½"	25" 20"	*HAULPAK has higher clearance,* to minimize troublesome "dozing" action.
Brake Surface (sq inches)	1511	4680	1834	5148	*HAULPAK has bigger brakes,* for greater safety, more steady use of high speeds.

and here are some of the design features that make these HAULPAK advantages possible

(*Based on specifications available at time of printing)

All new . . . but Haulpak is already a *fully-proven* piece of equipment. Units worked for over 14 months on construction jobs, in mines, and in quarries, before the first Haulpak was put on the market. Exceptional results of these tests are now being duplicated all around the nation.

it can cut your haul costs

Hydrair* suspension...eliminates springs...permits higher clearance, shorter turns

Haulpak rides on air! 4 Hydrair units replace leaf springs. System cushions against loading and travel shock, reduces maintenance costs. Eliminates front axle, and compensates for off-center load. *COMPARE IT!*

"V"-shaped body...lets Haulpak outcarry trucks that are longer, higher, heavier

Bonus yardage in every Haulpak load rides in exclusive V-bottom of body. Slope also helps fill all corners for low-void payloads. "V" lowers center of gravity for better stability, traction, on grades. *COMPARE IT!*

Box-beam frame...3 times stronger, ⅓ lighter, carries 30% more payload weight

Strongest hauler body ever built. Floor and all wear-surfaces made of 10,000 psi steel, yet weighs 33% less than comparable bodies. Body is exhaust-heated. Haulpak hauls 30% more than its own total weight. *COMPARE IT!*

Available in 22, 27, and 32-ton capacities

PLUS: MINIMUM MAINTENANCE (entire lube-check, needed only at 500-hr intervals, consists of just 4 easy-to-reach grease fittings) . . . POWER-TRANSFER DIFFERENTIAL (famed Tournapull® feature which automatically transfers power to wheel on best footing when going is rough) . . . POWER-MISER FAN (cools with 20 to 25 less hp drain) . . . 100% RUBBER-MOUNTED BODY (absorbs impact and shock of loading) . . . FOUR SEPARATE BRAKING SYSTEMS (for fast stops with complete safety) . . . POSITIVE POWER STEER (for faster turning, easier handling) . . . SIMPLE SIX-GEAR FINAL DRIVE (compared to 12 or more usually standard) . . . BIG, ROOMY CAB (has many work-efficiency features).

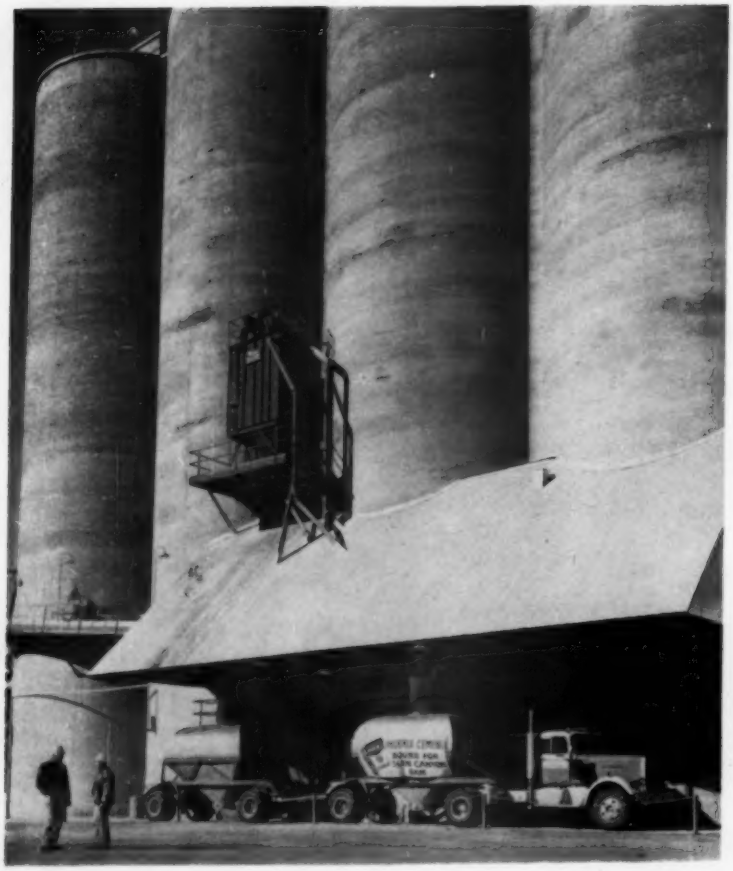
*Trademark HP-2193-DC-2

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

INDUSTRY NEWS



Trucks begin "largest ton-mile cement haul in history"

SHIPMENTS OF CEMENT began in February from Phoenix Cement Co.'s new Clarkdale, Ariz., plant to the site of Glen Canyon Dam at Page, 188 miles away. The big contract calling for 3.1 million bbl. of cement during the next three years will require a haul totaling about 137 million ton-miles. It was described as the "largest truck-ton-mile cement haul in history."

Men in the photo as the first truck loads are Les King, left, of Belyea Trucking Co., the firm that is transporting the cement, and Charles Fox, operations manager at Phoenix Cement's Clarkdale plant.

Phoenix, a division of American Cement Corp., loads the cement into special trailers that have hoppers built to fit its twin loading chutes. The trucks, carrying payloads of 27¾ tons, will make about 27,000 trips altogether. To make the 8.6-million-mile, round-trip cement delivery, Belyea will use a 20-rig fleet. Each rig consists of an Autocar diesel-powered tractor and two Fruehauf trailers. And the General tube-type tires were specially designed for this run: They have a cross-lug tread and are made of specially compounded rubber to meet the particular temperature conditions found in carrying maximum weight of 76,800 lb.

In the first two months, the contract called for delivery of 980 bbl. per day. This was due to increase this month to 1,960 bbl. and reach the maximum daily requirement (6,000 bbl.) by July 1.

Arriving at Page, the cement in each hopper is tested by Bureau of Reclamation chemists before acceptance. Then the load is weighed and deposited in storage silos adjacent to the automatic batching plant. The latter, 217 ft. high, has a capacity of 480 cu. yd. of concrete per hour.

Glen Canyon Dam will require 4.83 million cu. yd. of concrete. Aggregate is produced at a plant six miles north of the dam site and transported to the batching plant in conventional bottom-dump trucks.

Commerce Dept. assesses January construction

CONSTRUCTION REVIEW, published monthly by the U. S. Department of Commerce, contained the following summation of construction activity in January 1960: "The value of construction put in place was estimated at $3.7 billion, a drop of 8 percent from the December 1959 level but approximating the January 1959 total. On a seasonally adjusted annual basis, January 1960 construction was at a rate of almost $55 billion, about 5 percent higher than in preceding months, reflecting in part the overcoming of slowdowns probably caused by the steel strike during the 4th quarter of 1959. Every type of private construction held steady or showed a gain in January 1960 over January 1959, except for new dwelling unit expenditures which were down 3 percent. Private construction expenditures were up 6 percent for this period, but publicly owned construction was down by 12 percent; more than half of this decline was due to a 20-percent drop in the highway category."

(Continued on page 50)

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EAGLE PORTABLE SAND SECTIONS

go places and do things*

*Such as turning out a volume of specification concrete sand or two different gradations of sand at the same time. The Eagle Portable can do it because it has two Single Screw Fine Material Washer-Classifier-Dehydrators below a Water Scalping-Classifying Tank with automatic bleeder valves, multi-cell collecting-Blending flume and metering "splitter" gates, just like Eagle's stationary sand washing-classifying sections. Centralized push-button control.

And the Eagle Portable goes places—quickly made ready for travel—just hitch on a truck tractor—quickly set up at the operations site. Just wheel it in next to the screen. Now it's possible to make quick moves from one location to another in the same pit or locate in available pits near construction projects thus eliminating long material hauls. You can compete better—go where the business is with an Eagle Portable.

Eagle developed the Water Scalping-Classifying Tank—always ahead in engineering and service Eagle went a step farther and put it on wheels. Typical Eagle Portables of four different producers, in the States and Canada, are shown—a few of the many in use. Send for literature on Eagle Portable Sand Sections!

SINCE 1872

EIW

EAGLE IRON WORKS

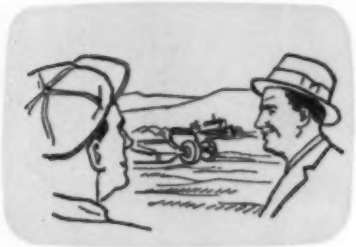
EAGLE IRON WORKS

ENGINEERS • MANUFACTURERS

137 HOLCOMB AVE. • DES MOINES, IOWA

FACTORY-TRAINED DISTRIBUTORS EVERYWHERE!

Bill Smith, contractor, speaks on used equipment!



"Take it from me, I've bought some real junk in used machines. Fixing 'em up and keeping them fixed used to be just one long headache.

"But now things are a lot different. When I buy used equipment, I buy from a Caterpillar Dealer.

"I've found Caterpillar used machines similar to new in more ways than one. They stand up better and are easier to keep working. And here's something else that's important . . .

"By keeping them in good shape, when I trade them back in, I get top dollar. I guess you could call that 'built-in' value!"

BONDED BUY

Your Caterpillar Dealer can give you the best used equipment buys in town. No other outfit offers you deals with this protection:

A "Bonded Buy" up to $10,000 on used Caterpillar equipment—your guaranteed assurance of satisfactory machine performance and on *all* parts of the machine during the guarantee period . . . and it includes labor, too. Also a "Certified Buy" and a "Buy and Try" class of machines that give you full value for the money.

You *know* what you're buying from a Caterpillar Dealer. He's listed in the Yellow Pages. Make his lot your first stop for used equipment.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

BEST BUYS IN NEW AND USED EQUIPMENT

Enter 1486 on Reader Card

(Continued from page 48)

Canadian cement shipments

CANADIAN MANUFACTURERS of portland cement reached an all-time high in shipments in 1959. Totaling 6,285,389 tons (36 million bbl., Canadian measure, where 350 lb. =1 bbl.), shipments were up from 6,157,817 tons in 1958. The Dominion Bureau of Statistics reports December shipments at 284,720 tons, up from 234,420 in December 1958.

The Financial Post described the Canadian cement industry in its February 20, 1960 issue. Total installed capacity in Canadian plants is close to 48 million bbl., against indicated consumption of 36 million bbl. Pointing to the probability of stiff battles in most markets, the paper also reported that still more growth is contemplated.

Inland Cement Co., subsidiary of Sogemines, Ltd., will add another million bbl. of annual capacity to its 2-million-bbl. plant in Edmonton, brought into production in 1956. And it is adding 500,000 bbl. to its 1-million-bbl. plant in Regina, acquired from Saskatchewan Cement Corp. in 1957. By midyear, the company's capacity will be 4.5 million bbl.

Also, British Portland Cement Co., London, England, is reported planning a $15-million plant near Cobourg, Ont., and Sogemines Ltd. reportedly has long-range plans for a $15-million plant on the South Shore of the St. Lawrence River opposite Montreal, where Miron Freres has recently completed a $30-million cement plant.

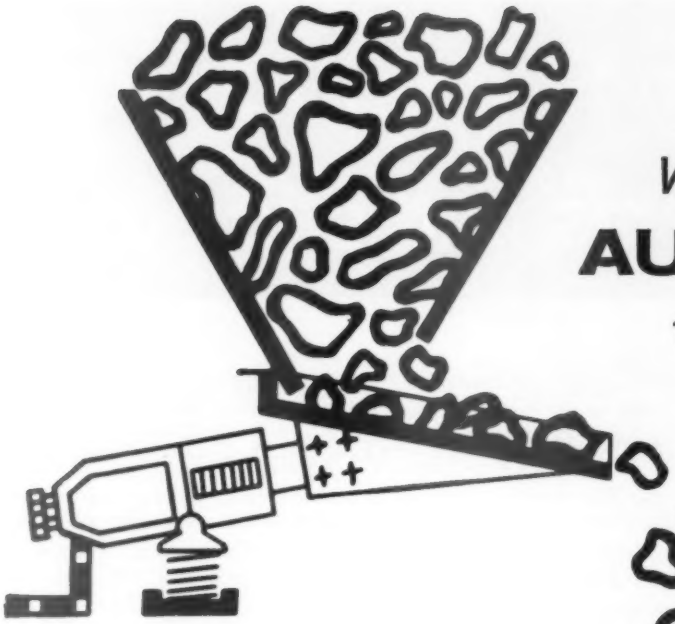
Of the present 19 cement plants in Canada, 8 are operated by Canada Cement Co., which has an annual capacity of 24 million bbl.

Archie Meade sells firm in the Seattle-Tacoma area

ARCHIE MEADE, founder and owner of the Meade Sand & Gravel Co., Midway, Wash., has sold the company. The new ownership is comprised of interests representing the McLaughlin Co., Inc., Great Falls, Mont.; the Midway Sand & Gravel Co., Seattle, and B-E-C-K Constructors, also of Seattle.

Mr. Meade has built the company since its founding in 1947 into a large enterprise that supplied ready-mixed concrete, crushed stone, sand and gravel to builders and contractors in the area between Seattle and Tacoma. The new owners will continue to oper-

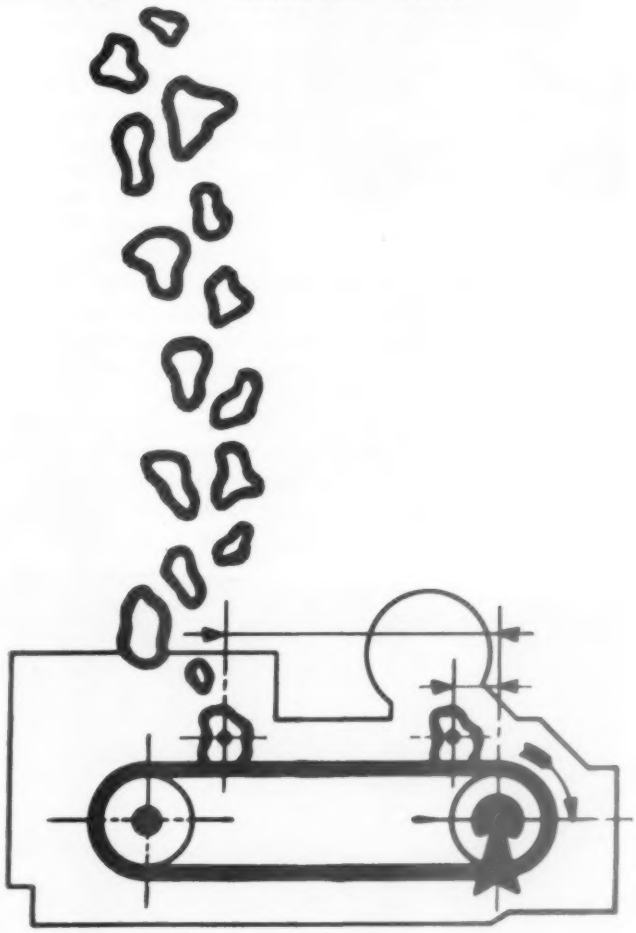
(Continued on page 55)



When you're planning

AUTOMATION...

there's a JEFFREY feeder to control material flow



JEFFREY ELECTRIC VIBRATING FEEDERS are capable of handling most classes of materials and of meeting all flow requirements—a few pounds or many tons per hour. Feeders can be operated on the level, up- or down-grade, and rate of feed can be changed at will while the unit is running. Various styles of decks can be furnished, to suit materials handled and operating conditions.

Many manufacturers include Jeffrey vibrating feeders to maintain a flow of materials into and away from the machinery they are building.

JEFFREY WAYTROL® CONSTANT WEIGHT FEEDERS are often designed into a system where bulk materials must be fed to a process at a definite rate, or where proportioning is handled automatically. The Jeffrey Waytrol is an accurate, rugged unit for weight-metering materials. Separate feeding components are supplied to meet individual requirements; vibrating feeders, spiral or belt conveyors.

Waytrols range in capacities from 60 pounds per hour to 750 tons per hour. Tell us the capacity you need, the character of the material you plan to handle, and Jeffrey engineers will recommend the feeding layout you need.

For Catalog 941 describing Jeffrey equipment for the process industry, write The Jeffrey Manufacturing Company, 935 North Fourth Street, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT

...TRANSMISSION MACHINERY...CONTRACT MANUFACTURING

Enter 1431 on Reader Card

"We carry up to 2,500 lb. more FORD Tandems and still outrun

SAYS HARRY R. KUNZ
PRESIDENT, KUNZ PAVING CO.
SAN MATEO, CALIFORNIA

Mr. Harry R. Kunz, a Registered Public Accountant in the construction field for 20 years, started the Kunz Paving Company in 1954. He and his two sons, Harry Jr. and Gerald, expect to do $500,000 worth of work with their fleet of 16 Ford Trucks this year. Here is what he has to say about these trucks.

"Our experience with Fords has proved them to be the best all-around truck we can buy! They haul more payload, cut down considerably on trip time and cost less to operate and maintain.

"The lighter chassis weight of the Ford Tandems lets us carry as much as 2,500 pounds more than competitive makes. This extra payload means that we can haul as much in ten trips as the others do in eleven. Our Fords will beat them on a trip-for-trip basis, too!

"On a 30-mile haul, our '59 T-800 equipped with Transmatic Drive will lap other trucks on the same job every fourth trip. This not only reduces our hauling costs but it makes our Ford's more attractive as rental units for other contractors. One of our associates had two of his trucks and two of our Fords working on the same job. He actually paid for the rental of our trucks by the extra trips they made.

"Our cost records, set up on an hourly basis to make it easier to prepare bids, show that the longer life built into Ford Trucks makes them less costly to operate. We have one '56 Ford T-750 with over 100,000 miles on it that we use as a base for our tandem hauling costs. In spite of its high mileage – gas, oil, tires, maintenance and repairs amount to only $2.08 per hour. Facts and figures like these keep us sold on Ford Trucks for our business."

payload on our other trucks on the same job!"

Again in '60... FORD PICKUPS beat all leading makes in Gasoline Economy!

Ford Six delivers 13.1% better gas mileage in second running of Economy Showdown U.S.A.* Standard 1960 ½-ton pickups of the five leading makes were purchased from dealers just as you would and run both empty and loaded, over flat terrain and hills, at low and high speeds, under city traffic and retail delivery conditions.

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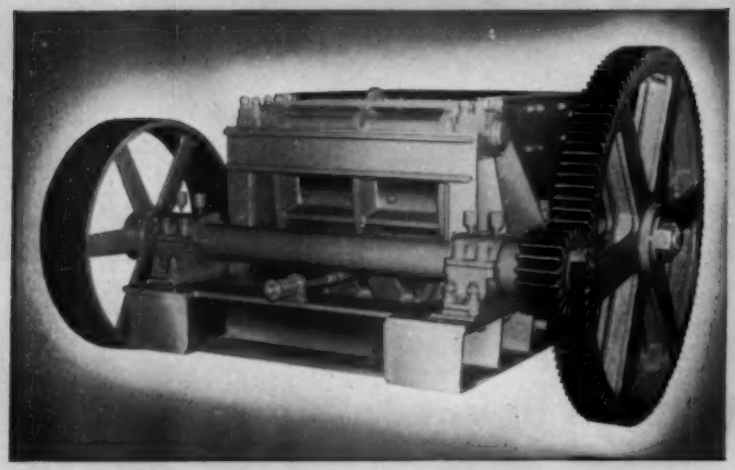

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New job-proved single roll crusher brings you lower operating, maintenance costs

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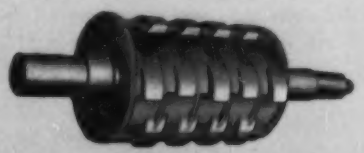

Cast alloy steel roll shell is made in one piece and keyed as well as shrunk on the rollshaft. No segments or renewable teeth to loosen or fall out. Readily accessible teeth are easily built up by welding.

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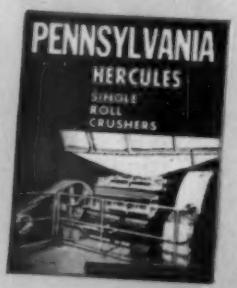

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(Continued from page 50)

ate the company under his name. They also plan to produce construction materials on a 450-acre site near the City of Kent, recently owned by Kent Highlands, Inc.

Officers of Meade Sand & Gravel will be Dick Egge, B-E-C-K Co., president; Joseph Romano, Midway Sand & Gravel Co., vice president; Cecil Sederholm, McLaughlin Co., Inc., secretary. Present personnel, with Donald A. Martin as general manager, will remain. Mr. Meade will devote his time to real estate interests.

For product identification, it's now Solite Corporation

SOUTHERN LIGHTWEIGHT AGGREGATE CORP., Richmond, Va., has changed its name to Solite Corp. John W. Roberts, president, listed simplicity, brevity and product identification as the chief reasons for the name change. Solite Corp. produces Solite lightweight aggregate for use in structural concrete and masonry units.

The corporation recently purchased the two buildings that house its home offices at 2508 and 2510 Chamberlayne Ave., Richmond. Formed in 1947, Solite Corp. operates three wholly owned subsidiaries: Virginia, Carolina and Florida Solite.

Gypsum industry growth noted in several areas

DEVELOPMENT OF UNITED STATES GYPSUM CO.'S holdings in Mexico, opening of Kaiser Gypsum Co.'s gypsum board plant at Cerrillos, N.M., opening of National Gypsum Co.'s Lorain, Ohio, plant, and construction of a board-making operation at Albuquerque, N.M., by American Gypsum Co. are major developments in gypsum industry expansion.

U. S. Gypsum's proposed plant at La Borreguita, in San Luis Potosi State, Mexico, is depicted in the accompanying drawing. Construction was to begin the first of March on a crushing plant. Little stripping will be required, as rock lies exposed or close to the surface.

Crushed gypsum ore will be transported via the Mexican National Railroad, along which the quarry is situated, to the Port of Tampico. There it will be reloaded on ships and taken to the company's plants at New Orleans, La., and Galena Park, Texas. Present plans call for completion of construction by early fall, so operation of the quarry and shipment of ore can begin before the end of the year.

May 1, 1960 is the target date for the opening of Kaiser Gypsum's Rosario board plant. This gypsum processing operation is at Cerrillos, N.M., about 50 miles north of Albuquerque. Kaiser's plant will have an annual capacity of about 120,000 tons of wallboard and other gypsum products. A nearby quarry will furnish raw materials; finished products will be shipped over the Santa Fe Railroad to markets in Albuquerque, other parts of New Mexico, and throughout Texas, Colorado and parts of Oklahoma.

National Gypsum Co.'s Lorain plant was scheduled to open March 15. The company's Tawas City, Mich., quarry supplies rock for the plant which will manufacture wallboard, 16-in. lath and plaster. C. Rex Morgan, plant manager, said it will use about 3,000 tons of raw gypsum per week. One of the automated plant's features is a dust collection system that returns dust to the production process.

American Gypsum Co., Albuquerque, has offered more than $3 million of securities to finance construction of its new board-making operation. Actual cost of the plant will be nearly $1 million to produce 100 million sq. ft. of ⅜-in. equivalent wallboard an-

(Continued on page 57)

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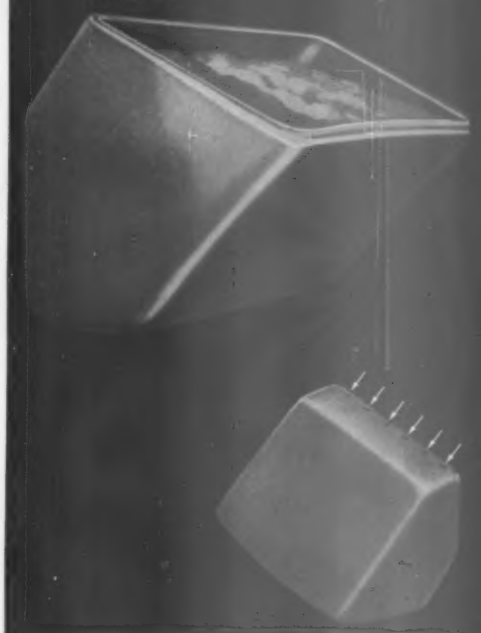

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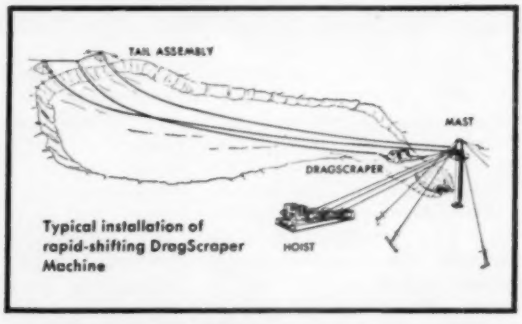

Typical installation of rapid-shifting DragScraper Machine

DragScraper Bucket deposits load of sand onto grizzly hopper.

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(Continued from page 55)

nually. Raw materials for the new plant will be acquired from White Mesa Gypsum Co., which owns about 1,100 acres of proven gypsum claims about 40 miles from Albuquerque, site of the board plant.

According to the prospectus offering common stock and 7-percent first mortgage notes, a construction contract has been placed with George A. Fuller Co. Major part of the equipment for the gypsum board plant will be acquired from J. B. Ehrsam & Sons Mfg. Co. Construction will be completed about May 1961.

Lehigh's President Young talks about transportation

IN LEHIGH PORTLAND CEMENT CO.'S annual report for the year ended December 31, 1959, President Joseph S. Young summed up his company's status and progress. Among other things, he explained Lehigh's policy on transportation methods, which has been effective in reducing costs.

"Our post-war expansion program," wrote Mr. Young, "has brought the source of Lehigh cement closer to the customer. We have increased the supply available at plants located in areas which were formerly partially dependent on cement from more distant points of manufacture. In addition, new manufacturing facilities have been constructed in regions which had never previously enjoyed a local supply.

"Prior to 1941 about 85 percent of industry shipments moved by rail and 15 percent by truck. Truck delivery means to the customer not only generally lower freight charges, but more economical unloading and handling. Truck shipments entail a much greater integration of shipping and loading facilities at our plants than do rail shipments. To prepare ourselves for this radical change in transportation requirements, we have designed all of our newer and revamped most of our older plants to handle truck as well as rail shipments.

"Today, despite materially reduced rail rates, truck delivery is used for 35 percent of the cement industry's shipments. We estimate that within the next several years over 50 percent of all cement will move by truck.

"The reduction in the proportion of transportation charges to total delivered price from 24 percent 10 years ago to 15 percent in 1959, does not fully illustrate the success of our program to lower delivery charges. Of more significance is the fact that Lehigh customers are paying on the average only three-quarters as much today to get cement from the plant to the point of use as they were 10 years ago. In spite of widespread price increases in many fields, the average delivered price paid for Lehigh cement has actually been declining since 1957."

Asbestos mill in California to open first unit June 1

A NEW ASBESTOS MILL under construction near Napa, Calif., is scheduled to start production June 1. The first of four mill units, each having a 250-tpd. capacity, is expected to be ready by that time. The 1,000-tpd. mill is part of a $1-million expansion program at the open-pit mine of Asbestos Bonding Corp. It is a wholly owned subsidiary of Clute Corp., Denver, Colo.

Clute president, John H. Lowell, said the 1,000-tpd. production will be able to supply about ⅕ the potential market in California. The Clute air-separation principle has been in operation in a pilot mill at Napa that has been processing 60 to 70 tpd. of asbestos ore. In a letter to stockholders, Mr. Lowell said, "In our pilot operation we have achieved 100-percent utilization of the ore. We are producing a series of grades and products ranging from a light fiber to products which consist of mixtures of fiber and fines."

Industrial Minerals, Rocks in revised third edition

THE AMERICAN INSTITUTE OF MINING, METALLURGICAL, AND PETROLEUM ENGINEERS has brought out a completely revised, third edition of the authoritative, comprehensive text, "Industrial Minerals and Rocks." It has been almost completely rewritten to keep pace with the rapid changes that have occurred in the field since the second edition was published in 1949.

According to its preface, the book is the collective achievement of the Industrial Minerals Division of AIME. The editor-in-chief, Joseph L. Gillson, and seven members of the editorial board—Ian Campbell, Sandford S. Cole, A. B. Cummins, Richard M. Foose, R. M. Grogan, Thomas L. Kesler and Raymond B. Ladoo, are past chairmen of the division. The other four editorial board members are: J.

(Continued on page 59)

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(Continued from page 57)

E. Lamar, head of the Industrial Minerals Division of the Illinois Geological Survey; M. F. Goudge, retired head of the Industrial Minerals Division of the Canadian Department of Mines; George W. Josephson of the Statistical Division of the U. S. Bureau of Mines, and George C. Lindsay, editorial director of ROCK PRODUCTS.

Its 55 chapters cover the field from abrasives to zirconium. Of special interest to ROCK PRODUCTS readers will be W. B. Lenhart's chapter on sand and gravel, Nelson Severinghaus' chapter on crushed stone and C. F. Clausen's on cement materials. The chapter on lime was contributed by Robert S. Boynton and Kenneth A. Gutschick, on asbestos by G. F. Jenkins, on gypsum by J. F. Havard, on phosphate rock by James A. Barr and on lightweight aggregates by T. A. Klinefelter.

The volume is a distinguished addition to the AIME series sponsored by the Seeley W. Mudd Memorial Fund. The series got its start with the original edition of "Industrial Minerals and Rocks" in 1937.

Industrial Minerals and Rocks, January 1960, 946 p., $12.00.

Dundee plant starts up with 5-million-bbl. annual rate

PRODUCTION BEGAN MARCH 1 at the $25-million plant of Dundee Cement Co., Dundee, Mich., southwest of Detroit. The plant has large initial rate of production—5 million bbl. per year. Indicated in the picture are (1) quarry containing clay and limestone deposits; (2) primary crusher; (3) cement storage silos with rail and truck loading stations; (4) conveyors and pipelines hauling raw materials and coal; (5) crushed limestone and coal storage area; (6) storage area for 200,000 tons of cement clinker; (7) main plant; (8) two, 460-ft.-long rotary kilns; (9) electrostatic precipitator area, and (10) office buildings.

Water, rail and truck transportation facilities are available to the Dundee plant. During the Great Lakes shipping season, it can ship on the Lakes or on the St. Lawrence Seaway. The company has storage silos and a shipping dock at nearby Monroe, Mich., for access to water transportation.

IMC uses iron pipe to seal off water in potash mine

INTERNATIONAL MINERALS & CHEMICAL CORP., Skokie, Ill., is using a European technique for sealing out water from a shaft at its Esterhazy, Saskatchewan, potash mine. New to the western hemisphere, the method involves installation of an 18-ft.-diam., cast-iron lining in the 300-ft.-deep, water-laden formation.

The shaft had been sunk through 300 ft. of glacial till and 900 ft. of shale. It remained to be sunk through the 300-ft. watery Blairmore formation and 1,500-ft. limestone layer before reaching potash at the 3,100-ft. level.

Dr. I. M. Le Baron, vice president of IMC, described the project for The Financial Post. The Blairmore formation was to be frozen to minus-50 deg. F. to permit installation of the rings. Sixty-five rings, each 5 ft. high by 18 ft. diam. and 18 in. thick, were to be joined to form a continuous, watertight section. Thawing of the ground would be permitted after the rings were sealed with lead and bitumen and the tube anchored into the rock at either end.

International Minerals expects to start production at an initial rate of 1,200 tons of potash concentrates in 1961. The surface plant may be finished this fall. "We have plans for a second shaft and additions to the first," Dr. Le Baron was quoted. "We plan to expand immediately after getting into production."

Another potash producer, Potash Co. of America, used another method to combat water flow. When the ground was frozen, it built a concrete shaft through the watery formation. The Financial Post reports that thawing of the ground is believed to have twisted and damaged the shaft, and that repairs are now required.

New access slope and shaft at Bestwall mine in Kansas

DRAVO CORP., Pittsburgh, has a contract to sink a new access slope and ventilating shaft for a Bestwall Gypsum Co. mine in northeastern Kansas. The mine will serve Bestwall's

(Continued on page 60)

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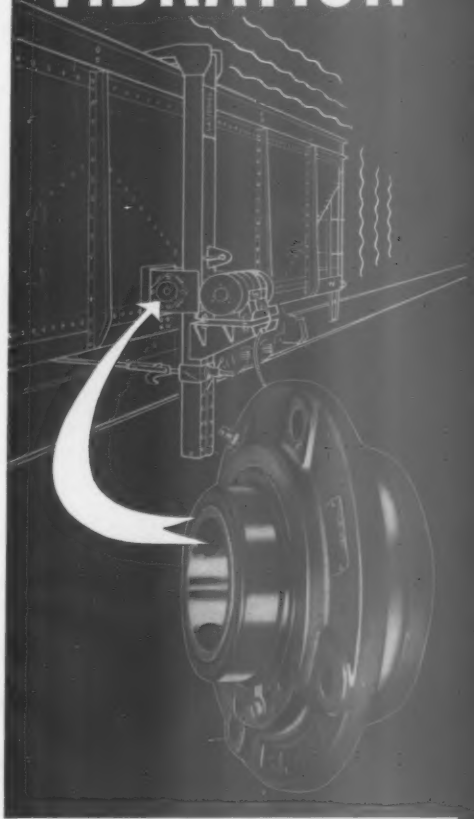

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(Continued from page 59)

modern, new plant at Blue Rapids. It is described as the oldest active gypsum mine west of the Mississippi, and contains gypsum with a purity rating of upwards of 99 percent.

Bestwall's new plant at Blue Rapids will replace its present facilities there. Production is expected to increase by 100 percent, and will include specialty products, plasters, gypsum board and lath.

The slope, semicircular in shape with an 8-ft. radius, will be 572 ft. long, terminating in a 45 x 30 x 27-ft. crusher chamber. The 7-ft. diam. circular shaft will intersect the mine at a point 95 ft. underground. Walls of the slope will be reinforced with steel liner plates, with concrete grout behind them.

Firms allot expenditures for plant improvements

MARQUETTE CEMENT MANUFACTURING CO., Chicago, Ill., has authorized capital expenditures totaling more than $7.5 million for cost-saving improvements and replacements at several plants. Another cement company with a major improvement planned is American Cement Corp. Its Hercules Cement Co. Div. will install a system of fiberglas dust collectors on three large kilns at its Stockertown, Pa., plant. Work will be started this summer on the $1-million project. This plant has been improved until it is one of the most modern in the Lehigh Valley region, with a capacity of 3.5 million bbl. per year.

Marquette's major project covers the cost of completing the modernization program at the Superior, Ohio, plant. Production costs are expected to be cut nearly ⅓ as the result of improvements which should be completed early in 1961. The company engineers are relocating departments about 1,000 ft. from present facilities to take advantage of better foundation conditions. The site chosen shortens the raw material conveying system from the present 2,317 ft. to 870 ft. (quarry to plant) and makes the layout more compact and efficient.

Included in the new installation will be a covered craneway for raw material, coal and clinker storage, a raw grinding department with 9½ x 15-ft. grinding mills, raw mix and blending silos, a 425-ft. kiln, clinker storage silos and a finish grinding department featuring an 11 x 32-ft. mill. Capacity will remain at the present 1.25 million bbl. During construction, the operation will continue at present facilities so no production will be lost.

Nitric-acid explosive used in quarry blasting trial

MINE & QUARRY ENGINEERING (England), December 1959, has an article by T. J. Reid and J. W. MacGregor, "Blasting trial with a nitric acid explosive." The article describes an experiment at Ayr County Council's Parkthorn Quarry to assess the blasting capabilities of an oxygen-balanced mixture of dinitrotoluene and nitric acid. The explosive was prepared by an on-site mixing technique. (DNT is solid at normal temperatures. For convenience, one part of nitric acid was premixed with four parts of solid DNT. This kept it liquid, but was insufficient to render it explosive.)

A mixture containing 68 percent of 95-percent nitric acid with an oxygen excess of 4 gm. per 100 gm. explosive was selected for use in this trial. This was obtained by mixing 40 parts of the 4:1 DNT:nitric acid fuel with 60 parts of 95-percent nitric acid.

According to the authors, the explosive has these advantages: high power, density and velocity, good thermal stability, ease of initiation by the shock from detonating explosive and insensitiveness to friction. It is ideal for blasting hard rock. These advantages, they commented, were offset in the past, as far as practical application was concerned, by the corrosive nature of the explosive and the fume which it evolves.

In the trial blast, holes were blasted the same depth as was usual at the quarry—65 ft. Alkathene tubing lined the 2½-in. diam. holes down which the explosive mixture was poured. Three holes were used in the test, two loaded with the nitric acid and one with polar ammon gelatine dynamite as control. Experts observing the test agreed that the nitric acid explosive had blasted as efficiently as the nitroglycerine gelatinous one.

They concluded, however, that the

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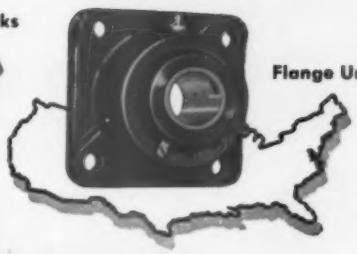

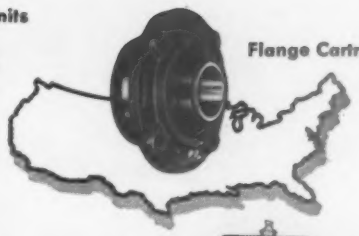

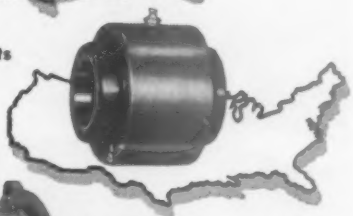

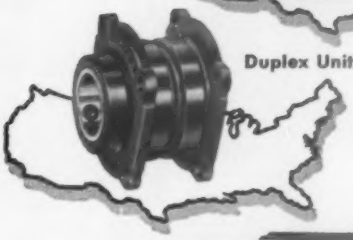

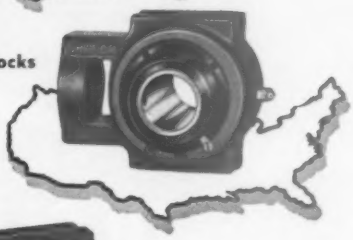

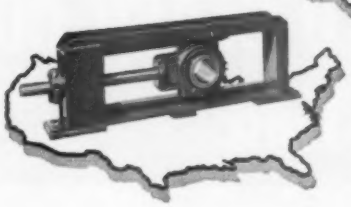

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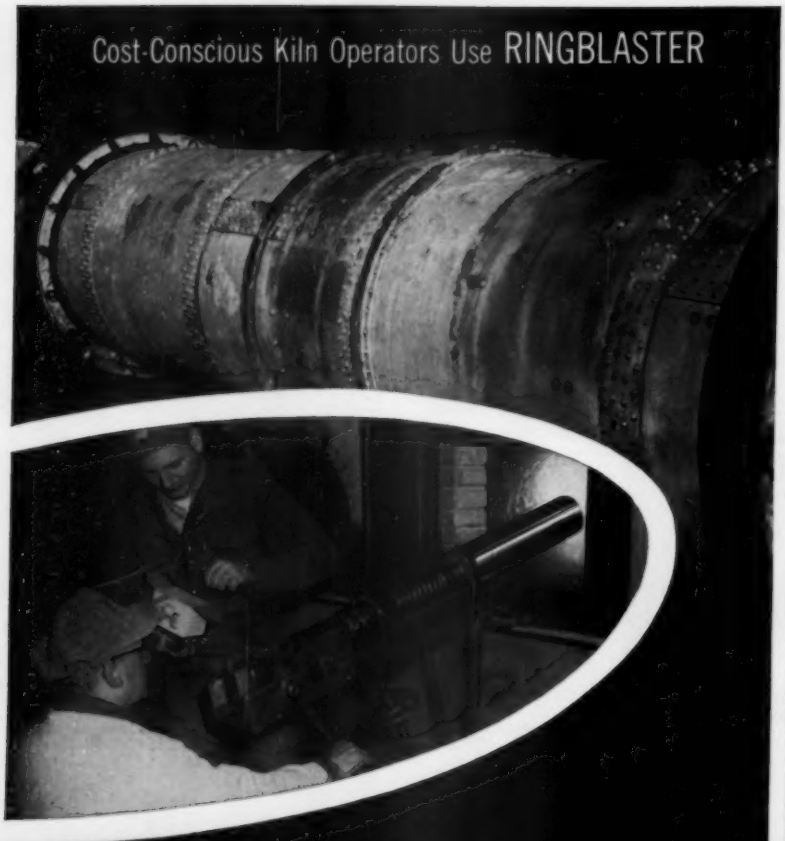
Cost-Conscious Kiln Operators Use RINGBLASTER



TO SLASH COSTLY DOWN-TIME

You'll profit with Ringblaster . . . the kiln gun that smashes kiln rings with exceptional speed and precision. Utilizing field-tested Western Super-X ammunition, Ringblaster breaks up rings faster, with fewer shots and less kiln down-time.

With special emphasis on safety, this industry-accepted kiln gun operates easily and efficiently . . . exclusive sound-reducer deadens firing noise and promotes worker comfort. Ringblaster can help make *your* kiln operations more profitable. Write today for further information.

Super-X Shell—For use in kilns over 150' long. Develops 8900 ft. lbs. of muzzle energy—breaks hard rings quickly and efficiently.

Reduced Velocity Shell—Lower-powered (approximately 7500 ft. lbs. muzzle energy) for ultimate efficiency in shorter kilns . . . minimizes possibility of damage to end plates, feed pipes, etc.

Super-X Zinc Shell—Extra-large zinc slug penetrates toughest rings. Use them with Super-X lead slugs for maximum penetration and "knock-down" power.

RINGBLASTER®
KILN GUN

another product by

Ramset® Fastening System

OLIN MATHIESON Chemical Corporation
WINCHESTER-WESTERN DIVISION
304-D Winchester Ave. • New Haven 4, Conn.

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(Continued from page 60)

mixture is not really suitable for such deep holes. There is too much pressure at the bottom, requiring an impracticably thick Alkathene liner; furthermore, it is difficult to get the liner to the bottom of a deep narrow hole. It would be more suitable for operations where there is very little pressure on the explosive.

The authors add another word of caution: The relative simplicity of mixing two liquids must not be allowed to overshadow the potentially dangerous nature of the mixture. The user is exposed to the same risks as the operator in an explosives factory.

Committee hears costs on raising road clearances

A BUREAU OF PUBLIC ROADS official, testifying before the Special House Subcommittee on the Federal-Aid Highway Program, said it will cost an extra $925 million to raise vertical clearances for structures on the interstate and defense highways from 14 to 16 ft. The figure would be $1.1 billion if they are raised to 17 ft., he said. The man testifying was Eric L. Erickson, the chief of the BPR's bridge division.

Here is a breakdown of the extra costs: To go to 16 ft., $195 million extra would be needed to build new structures in the future, $250 million to raise existing structures built since 1956 and $480 million to raise structures built prior to 1956 on roads that have been incorporated into the system.

To go to 17 ft., $313 million extra would be needed to build new structures in the future, $330 million to revise existing structures built since 1956 and $480 million to reconstruct existing spans built before 1956.

Keystone Trappe Rock appoints sales agency

BRADFORD HILLS QUARRY, INC., East Petersburg, Pa., is exclusive sales representative of Keystone Trappe Rock Co., Glen Moore, Pa. The announcement was made by John G. Galt, president of Keystone, and J. Fred Coleman, Jr., vice president in charge of sales for Bradford Hills.

Miles Washburn, formerly with Keystone, now will be associated with

(Continued on page 64)

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SPECIAL REPORT TO CATERPILLAR OWNERS:

CAT CATERPILLAR

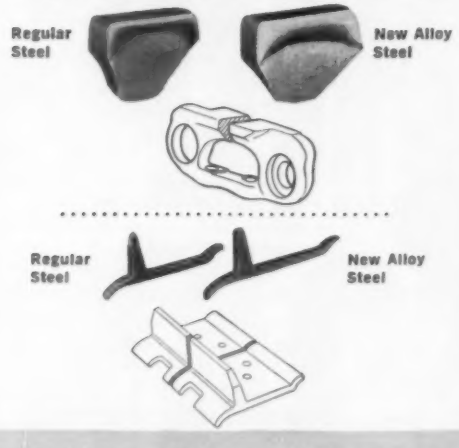
Parts you can trust
...cost less per hour

OPTIONAL TRACK GROUPS

up-date D9 or D8 Tractors for longer undercarriage wear

Now, two types of track groups are available for older model D9 and D8 Tractors . . . regular and optional, allowing you to tailor your undercarriage parts to meet job conditions.

Lighter tones at top of etched cutaways show depth of special hardness in wear zones.



REGULAR track parts are made from durable steel. They're heavy-duty, long-lived, special-hardened to resist wear.

OPTIONAL track parts are equivalent to those used on current production model tractors. The links and shoes are made from Caterpillar's new alloy steel that is hardened much *deeper* than regular steel. Link rails are hardened twice as deep. Shoe grousers are hardened 400% deeper. The new alloy steel also provides greater strength with more impact resistance.

MORE METAL WHERE IT COUNTS. Optional components are king size. Every part is beefed up and made bigger with more *hardened* steel in wear areas.

BORALLOY "HUNTING TOOTH" SPROCKETS are another new feature of the optional groups. Every other tooth is used in one revolution, alternate teeth being picked up the next revolution. This alternation means that teeth contact the bushings only *half as many times* as do regular sprocket teeth. More important are the teeth themselves—they're *machined* for exact fit with the big bushings. This greatly extends bushing life.

COMPARE regular and optional track components:

	Pitch	Pins O.D.	Bushings O.D.	Track shoe bolts and nuts	Sprocket
D8	regular 8 inches	1 3/4 inches	2 3/4 inches	3/4 inch	14 tooth
	optional 9 inches	2 inches	3 inches	7/8 inch	25 tooth
D9	regular 9 inches	2 inches	3 3/16 inches	7/8 inch	28 tooth
	optional 10 1/4 inches	2 1/4 inches	3 3/8 inches	1 inch	25 tooth

HOW MUCH MORE LIFE? Variation in the length of track life occurs because components have different wear rates under various soil and job conditions. In sand, pins and bushings wear faster. In rock, shoes and links wear faster.

ON-THE-JOB TESTS confirm that the new optional track components are giving up to 40% more life than the regular parts. On many applications, you can expect even greater wear life.

CORRECT TRACK GROUP SELECTION IS IMPORTANT. It depends on job types and conditions. Let your Caterpillar Dealer analyze your track needs. He'll recommend the correct components to help you get maximum life at the most reasonable investment. Call him soon.

SERVICE TIP: **FREE!** Handy reference for ordering track options. "New Options for D9 and D8 Tractors" includes part numbers that are used to adapt to your older models. Pick up a copy at your Caterpillar Dealer's.

CATERPILLAR

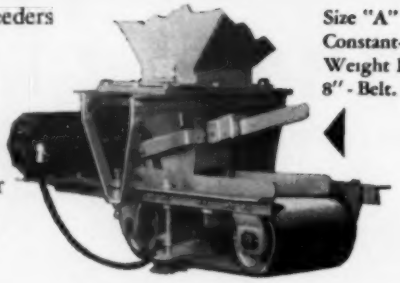
Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

Caterpillar Tractor Co., General Offices
Peoria, Ill., U.S.A.

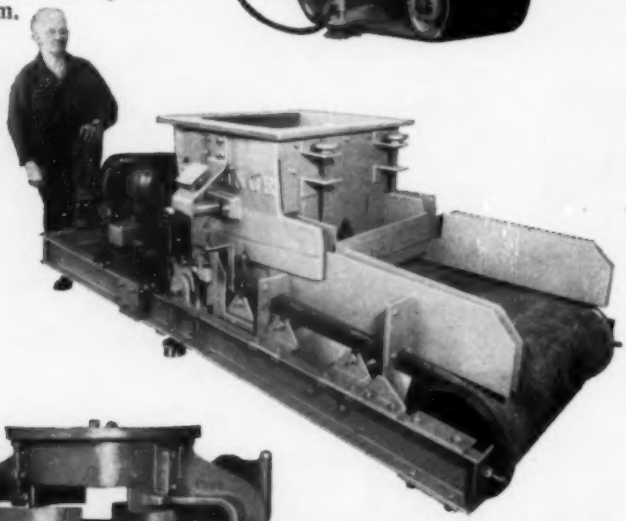
From 100 Pounds/hour To 200 Tons/hour

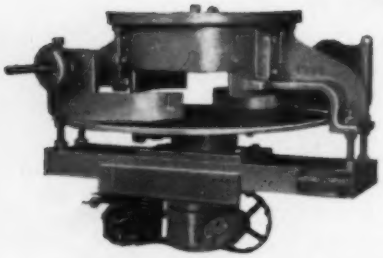
All **HARDINGE** Feeders are suspended from the feed bin which:

- Eliminates costly feeder support structure
- Provides accessibility to equipment following feeder
- Requires extremely low head room.



Size "A" Constant-Weight Feeder, 8" - Belt.

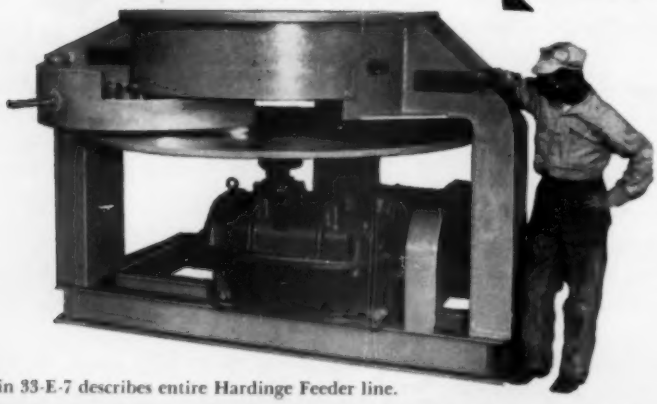




Size "D" Constant-Weight Feeder, 36" - Belt.

30" Disc Feeder

84" Disc Feeder



Bulletin 33-E-7 describes entire Hardinge Feeder line.

HARDINGE
COMPANY, INCORPORATED

YORK, PENNSYLVANIA • 240 ARCH ST. • Main Office and Works

New York • Toronto • Chicago • Hibbing • Houston • Salt Lake City • San Francisco • Birmingham • Lakeland

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(Continued from page 62)

Bradford Hills. He will handle all sales of trap rock, working out of Keystone's plant at Cornog as well as out of Bradford Hill's Morgantown plant. His territory will cover South Jersey, Maryland, Delaware and southeastern Pennsylvania.

John G. and Howard Galt will remain in their respective positions as president and vice president of Keystone. They will continue to operate the Cornog plant.

Book helps reduce electric costs in industrial plants

AN ENGINEERING GUIDE to lower power costs, "Electrical Efficiency in Industrial Plants," has been published by F. W. Dodge Corp., New York. Written by Edwin S. Lincoln, electrical consultant, it faces up to the fact that waste and misuse of electric power is a major and frequently hidden drain on efficiency and profit. The dollar loss from this drain is often small within a given period; however, this loss of profit goes on and will be compounded as new equipment and loads are added. The only way to cut this persistent waste is by constant analysis and correction of usage.

The handbook tells how to make surveys of load, power factor, voltage, lighting, wiring and electric protection. All necessary instruments are discussed in detail, with emphasis on their selection, continued use and maintenance.

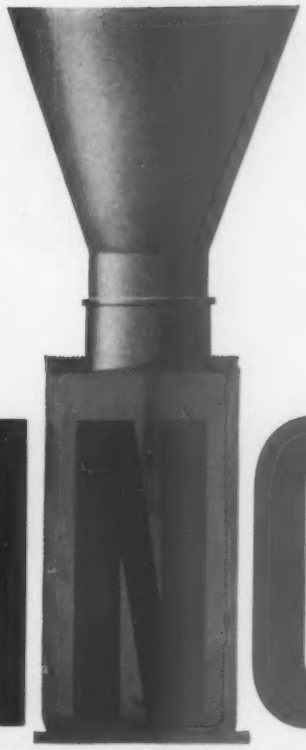
Evans, Coleman & Evans replaces Mary Hill plant

THE AGGREGATES PLANT operated by Evans, Coleman & Evans, Ltd., at Mary Hill, British Columbia, is being replaced by a new, highly automated operation. The plant under construction is requiring an outlay of $1.5 million, and will be ready for operation in July.

The Canadian company's officials said the plant will be capable of producing six stone sizes and three sand sizes in any combination. Input capacity will be 600 tph. and barges can be loaded at 1,500 tph. Blending will be achieved automatically with special controls by drawing required quantities of materials onto a belt conveyor

(Continued on page 68)

last year over 100 firms lowered their multiwall bagging costs through UNION-CAMP'S



PACKAGING MACHINERY

another FREE service of the ★ Star Packaging Efficiency Plan!

More efficient packaging machinery is just one feature of the 5-Star Plan. Yet it has helped over 100 companies lower their multiwall bagging and handling costs. All within the last two years!

A midwest packer—by following recommendations made by UNION-CAMP packaging engineers—speeded his bagging rates and saved $48,500. A southern multiwall user now enjoys similar economies. As a result of a 5-Star Plan survey, he installed a UNION I & C Bagger. The new unit cut his labor expense 60 per cent.

For many other firms, installing automatic I & C Acto-Cutters on bagger sewing heads has reduced bagging crews by as much as a third.

The 5-Star Plan offers you impressive money-saving opportunities regardless of the size of your operation. Besides packaging machinery this comprehensive service covers bag design, bag construction, specifications control and a detailed survey of your plant.

And it's free!

UNION-CAMP®
MULTIWALL BAGS
Union Bag-Camp Paper Corporation 233 Broadway N.Y. 7, N.Y.

★ BAG DESIGN · BAG CONSTRUCTION · SPECIFICATIONS CONTROL · PACKAGING MACHINERY · PLANT SURVEY

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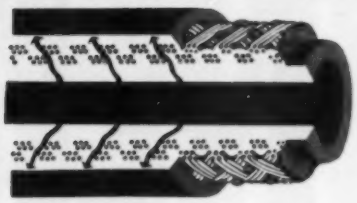


"MORE USE PER DOLLAR"

Rubber tie-gum penetrates Homoflex braided plies to provide an inseparable tube-to-cover bond. More flexible and lighter weight than any hose for equal pressure.

R/M HOMOFLEX HOSE HANDLES EASIER...LASTS LONGER

Homoflex Air Hose is mandrel-made with *no* pre-set twist—it coils and uncoils freely in *any* direction *without* kinking! It's the easiest handling hose you can use with air drills. Exclusive Homoflex construction makes strength member and tube virtually inseparable, assures long, trouble-free service life. Uniform inside and outside diameters permit faster, easier, *safer* coupling . . . faster, fuller flow.

Strong, light weight, and "flexible as a rope", Homoflex Air Hose adds up to real labor and cost savings on the toughest jobs. Homoflex H.D. Air Hose is also available for extra heavy duty and *with yellow cover stripe* for visibility; also in type for water in mine use.

- **SUPER STRONG**
- **PRECISION BUILT**
- **LIGHT WEIGHT**
- **FLEXIBLE AS A ROPE**

Write for Bulletins M610 and M694.

RM-1017

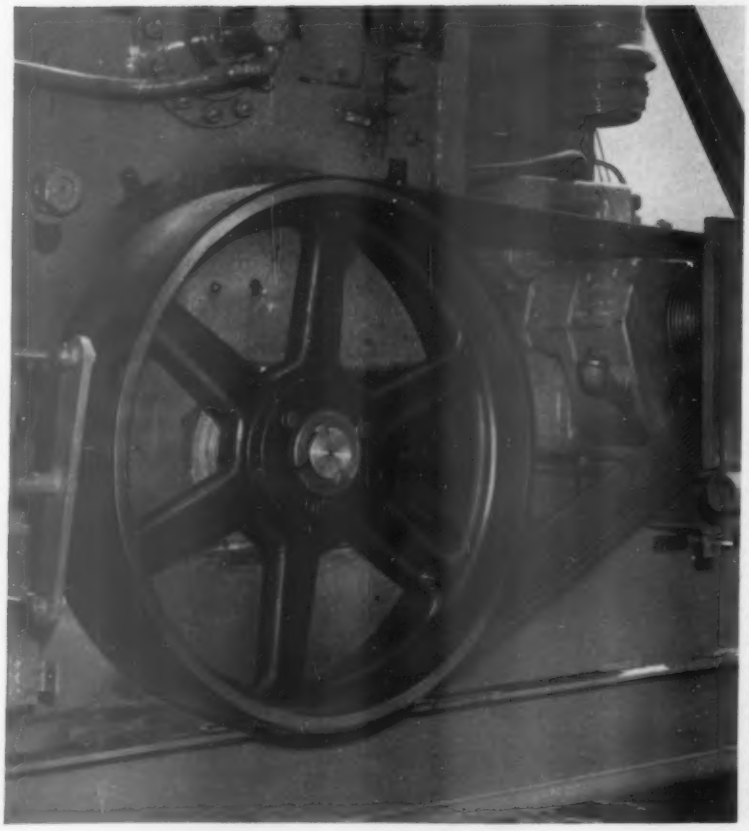
RAYBESTOS-MANHATTAN, INC.
MANHATTAN RUBBER DIVISION, PASSAIC, NEW JERSEY

RM

ENGINEERED RUBBER PRODUCTS ..."MORE USE PER DOLLAR"

RAY-MAN CONVEYOR BELT *Engineered for 45° Idlers*

You can now get up to 60% greater hauling capacity—save up to 20% on conveyor costs—as compared to using regular 20° idlers. Ordinary ply belts are too stiff and boardy to do the job—Ray-Man's exclusive flexible construction and built-in stress compensation is *guaranteed* to take the sharp angle of 45° idlers *without* ply or cover separation at the hinge line. Learn how Ray-Man Conveyor Belt opens up a whole new era of conveyor design . . . permitting larger loads . . . narrower conveyors —assuring longer cover wear, lower handling costs! Write for Bulletin M303.



CONVERT TO R/M POLY-V® DRIVE FOR MORE POWER IN LESS SPACE... *with Reliability*

- SINGLE UNIT V-RIBBED DESIGN
- ELIMINATES BELT "MATCHING" PROBLEMS
- MAINTAINS GROOVE SHAPE
- CONSTANT PITCH AND SPEED RATIOS
- LESS WEAR ON BELT AND SHEAVES
- COMPLETE CONTACT-PRESSURE

Just two Poly-V belt cross sections meet every heavy duty power transmission requirement.

R/M Poly-V* Drive is the smoothest and coolest running —*longest wearing* drive you can install. Discuss your application with an R/M Distributor . . . or write for Poly-V* Drive Bulletin M141.

**Poly-V is patented by Raybestos-Manhattan, Inc.*

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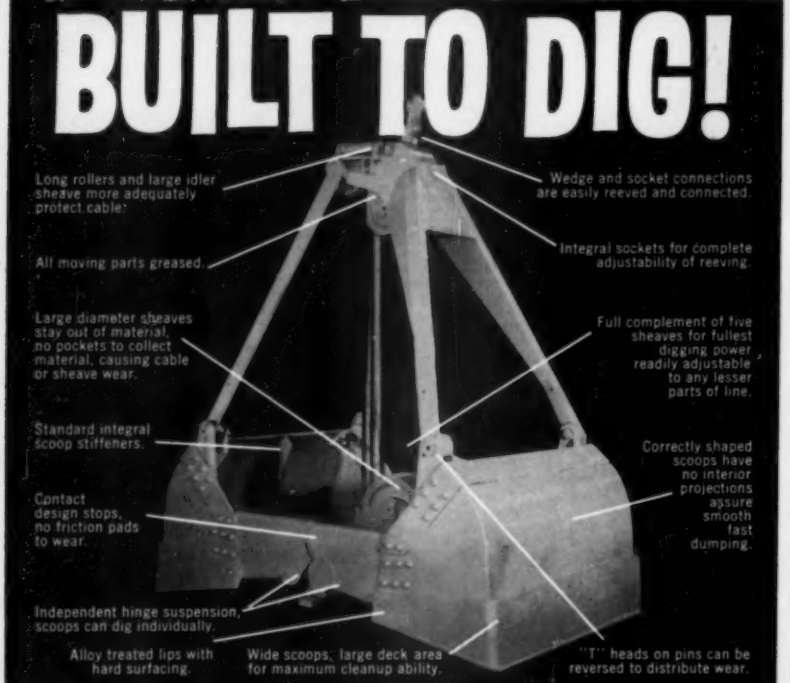
BUILT TO DIG!


Long rollers and large idler sheave more adequately protect cable.
All moving parts greased.
Large diameter sheaves stay out of material, no pockets to collect material, causing cable or sheave wear.
Standard integral scoop stiffeners.
Contact design stops, no friction pads to wear.
Independent hinge suspension, scoops can dig individually.
Alloy treated lips with hard surfacing.
Wide scoops, large deck area for maximum cleanup ability.
Wedge and socket connections are easily reeved and connected.
Integral sockets for complete adjustability of reeving.
Full complement of five sheaves for fullest digging power, readily adjustable to any lesser parts of line.
Correctly shaped scoops have no interior projections assure smooth fast dumping.
"T" heads on pins can be reversed to distribute wear.

WILLIAMS BUCKETS

Durable clamshell and dragline buckets for every application

Williams Bucket Division, The Wellman Engineering Company, 113 St. Clair Ave. N.E., Cleveland 14, Ohio

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The Wellman Engineering Co.
113 St. Clair Ave. N.E., Cleveland 14, Ohio
Please send me the new Williams Bucket catalog.

NAME_____
COMPANY_____
ADDRESS_____

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(Continued from page 64)

running through a reclaiming tunnel below stockpiles. This is the third such blending system designed by Western-Knapp Engineering Co.

Houdaille looks ahead; will boost construction materials

HOUDAILLE INDUSTRIES, INC., New York, expects to spend $3 million this year to expand and modernize plants, according to The Wall Street Journal. This is about the same as the 1959 outlay and above the 1958 level. Ralph F. Peo, chairman of the board, said the company hopes to add another $25 million in sales through acquisitions, with about half the growth in construction materials and the other half in manufacturing.

Since the company began to diversify in 1955, it has bought eight companies, five in the construction materials field. "Houdaille is shooting for $100 million in sales in 1960 from our present organization and exclusive of any future acquisitions," Mr. Peo said.

Canadian sand and gravel

SHIPMENTS OF SAND AND GRAVEL by commercial operators in Canada during 1958 amounted to 160,210,945 short tons, valued at $96,282,363. The preceding year recorded shipments of 159,829,512 tons, valued at $91,939,354. These totals include sand and gravel used by railroads as ballast, gravel used by mines as back fill and sand recovered by dredges, as well as similar materials from other sources. Imports in 1958 were 233,518 tons; exports, 353,155 tons.

Perlite discovery spurs new industry

A CONTRACTOR HAULING MATERIAL from Oneida County, southeastern Idaho, discovered an extensive perlite deposit which has been estimated to contain more than 6 million tons. The contractor, Marion J. Hess, has formed a new corporation, United Perlite Corp., to process the ore. The deposit is about 25 miles northwest of Malad, Idaho. A plant will be built on the 4½-acre site of the open-pit mine.

(Continued on page 70)

25% more hole per hr.

in hard limestone with high silica content

...than with competing rig

Quarry performance like this is standard with REICHdrill. Why? Because:

- ...all-hydraulic top-drive rotary provides infinitely variable speed of drill rotation – the right speed for every formation.
- ...direct-drive to drill stem saves power loss.
- ...all air used to drill and clean hole.
- ...no complicated transmission, no rotary table.
- ...no kelly bar – in and out of the hole faster.
- ...instant safety torque release protects all drive components.

REICHdrill has built a reputation for keeping maintenance costs low; footage records high.

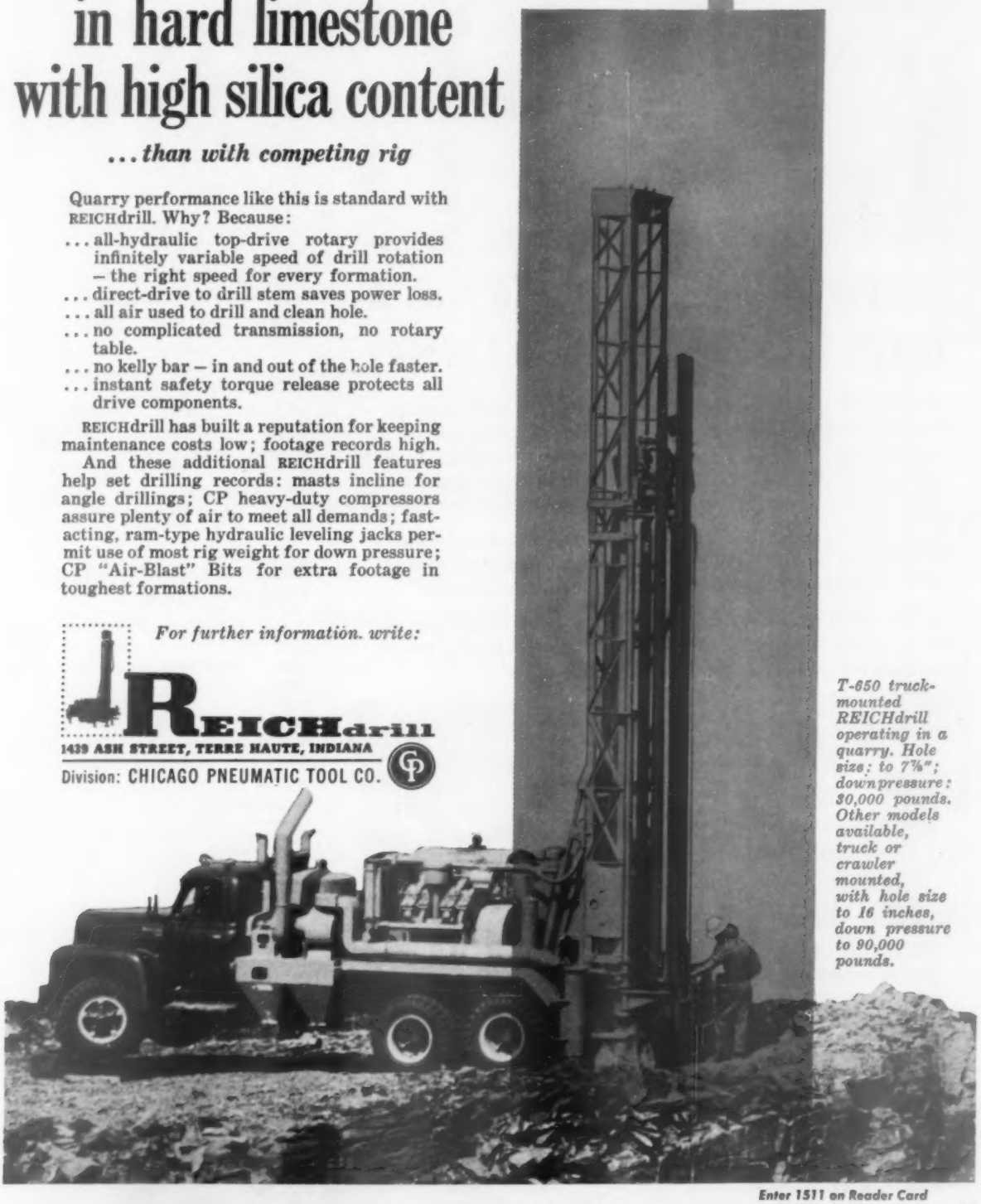
And these additional REICHdrill features help set drilling records: masts incline for angle drillings; CP heavy-duty compressors assure plenty of air to meet all demands; fast-acting, ram-type hydraulic leveling jacks permit use of most rig weight for down pressure; CP "Air-Blast" Bits for extra footage in toughest formations.

For further information, write:

REICHdrill

1439 ASH STREET, TERRE HAUTE, INDIANA

Division: CHICAGO PNEUMATIC TOOL CO.



T-650 truck-mounted REICHdrill operating in a quarry. Hole size: to 7⅞"; downpressure: 30,000 pounds. Other models available, truck or crawler mounted, with hole size to 16 inches, down pressure to 90,000 pounds.

Enter 1511 on Reader Card

"Needed A Big Coupling To Lick A Tough Job–Got It With A Lovejoy"

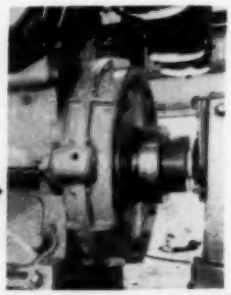
And it's been going steadily for over 1½ years, 16 to 20 hours per day—driving between a 350-hp., 400-rpm. synchronous motor and a preliminary crusher on which 5 other makes of couplings broke down within 6 months. Maintenance during that period amounted to one dusting, solely for the purpose of the above photograph.

These facts come from a large midwest cement company where clinkers hard enough to cut glass are ground. Other conditions are dust and abrasion, .065 parallel and 2° angular misalignment.

On this and other heavy duty applications, Lovejoy Couplings are saving initial costs, eliminating maintenance and lasting longer. For instance:

Lovejoy CF 280 mounts directly to flywheel of engine to provide compact drive connection to gear box on giant crawler crane.

Lovejoy CF 400 provides direct drive from a 12-cylinder, 400-hp. diesel to a 4-cylinder double compressor.



Remember, too, that Lovejoy Flexible Couplings require only a straight edge to quickly and properly align.

Get the facts. Give us your requirements, and we'll recommend the right coupling—fractional to over 4000 hp. Request Catalog C-58.

LOVEJOY FLEXIBLE COUPLING CO.

4822 WEST LAKE STREET — CHICAGO 44, ILLINOIS

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(Continued from page 68)

Victor adds third kiln to nodulize phosphate rock

VICTOR CHEMICAL WORKS, Chicago, Ill., has retained Meissner Engineers, Inc., of Chicago to design the raw materials handling and feed system for a new kiln to produce nodulized phosphate rock. Included in the project are the kiln, cooling, crushing and screening facilities, scrubbing tower, dust collection system and clarifying tank. This facility will augment the two present kilns at Victor's Mt. Pleasant, Tenn., plant.

West Pakistan to have three new cement plants

CEMENT PRODUCTION in West Pakistan will be increased with erection of three new privately owned cement plants. The chairman of the Pakistan Industrial Development Corp. announced that the plants would be located at Manghopir (Karachi), Gharibwal (Jhelum) and Sang Gjai (Rawalpindi), Pakistan.

Rock firms report 1959 sales figures

THE FOLLOWING LIST has been compiled of 1959 net earnings of some firms in the rock products industry to show comparison of earnings with those of the previous year. Of those companies whose figures were available, most showed slight gains. Except where listed, fiscal year ended December 31.

Company	Net income (millions) 1959	1958
Allentown P. Cement	$ 3.2	$ 2.7
Alpha P. Cement	7.0	4.9
American Cement	6.8	6.7
Bessemer Limestone & Cem.	2.0	1.7
Bestwall Gypsum	4.8	4.3
*Canada Cement	7.0	7.2
Flintkote	14.3	12.2
General P. Cement	12.1	11.2
Giant P. Cement	4.1	3.0
Ideal Cement	20.5	18.6
Johns-Manville	31.6	23.4
Kaiser Industries	15.7	15.0
Keystone P. Cement	2.3	2.0
Lehigh P. Cement	9.4	6.9
Longhorn P. Cement	2.4	2.4
Louisville Cement	3.8	2.4
Marquette Cement	9.5	8.7
Medusa P. Cement	4.7	4.9
Min. & Chem. Corp. of Am.	2.1	1.3
National Gypsum	25.6	19.5
*Northwestern States P.C.	2.5	2.4
Pacific Cem. & Agg.	2.3	2.0
Penn-Dixie P. Cement	9.5	8.5
Ruberoid	6.6	4.9
South Dakota Cement	3.8	2.9
U. S. Gypsum	46.3	41.0
Whitehall Cement	1.5	1.2

*Year ended Nov. 30.

(Continued on page 72)

When 4-foot rocks slam down, rugged TYLER design pays off

On this construction job, 14-ton truckloads of material are dumped down a chute to this Tyler Ty-Rock vibrating screen. It separates the finer materials, passes rip-rap for facing use.

After studying the requirements of this job, the Tyler sales engineer recommended a heavy duty Ty-Rock vibrating screen. This unit is rugged, and dynamically balanced so that all power is expended in effective separation of the material handled. It's proved a reliable performer on this project—takes giant rocks in stride—handles 600 tons per hour.

Tyler Screening Service offers you equipment perfectly matched to your job. Your Tyler representative has the experience and know-how to give you results—backed by the world's leading manufacturer of woven wire cloth, and of a full line of screening machines. Call Tyler and be sure.

WOVEN WIRE SCREENS • SCREENING MACHINERY • TESTING SIEVE EQUIPMENT

TYLER

The W. S. TYLER Company • *Cleveland 14, Ohio*

OFFICES: New York • Chicago • Boston • Philadelphia • Atlanta
Dallas • Los Angeles • San Francisco • Baltimore • Birmingham • Houston • Minneapolis
Pittsburgh • Salt Lake City • The W. S. Tyler Company of Canada, Limited,
St. Catharines, Ontario • OFFICE: Montreal

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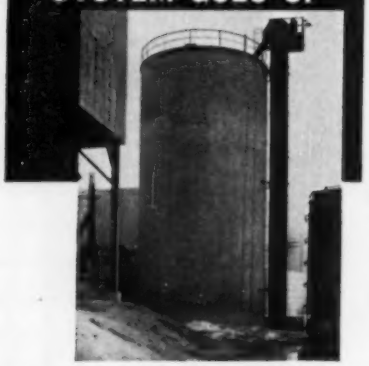
BULK STORAGE COSTS GO DOWN WHEN A *Marietta* CONCRETE SILO SYSTEM GOES UP



Whether your requirement is for one or many silos you can't beat the complete flexibility of a Marietta Concrete Silo System for bulk storage. It adds efficiency and cuts storage losses because each system is tailored to fit your exact requirements. And, each unit is designed for complete integration with whatever mechanical or pneumatic handling system required for the material stored.

When you consider bulk storage problems be sure to consult Marietta engineers for qualified recommendations on the concrete silo system that is best suited to your particular needs. They will work closely with your consultants and contractors to assure you the most efficient and flexible bulk storage system possible.

Write today for a copy of the Marietta Modern Industrial Storage Systems booklet that illustrates the wide application of Marietta Concrete Silos for bulk storage.

Only with Marietta are you assured the best construction to meet your storage requirements because only Marietta offers four types of concrete staves.

Marietta CONCRETE DIVISION,
AMERICAN-MARIETTA COMPANY
Marietta, Ohio

Representatives in principal cities

Branch Offices: Baltimore 21, Maryland, Charlotte 6, North Carolina, Jamestown, New York

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CALENDAR

OF COMING EVENTS

April 28-30, 1960
Texas Aggregates Association, sixth Annual Convention, Hilton Hotel, El Paso, Texas

April 28-30, 1960
The American Institute of Mining, Metallurgical and Petroleum Engineers, Pacific Northwest Metals and Minerals Conference, Sheraton Hotel, Portland, Ore.

May 15-17, 1960
Empire State Sand, Gravel and Ready Mix Association, 9th Annual Convention, Sheraton Inn, Binghamton, N.Y.

May 17-19, 1960
Cement Industry Subcommittee, American Institute of Electrical Engineers, Technical Conference, Pfister Hotel, Milwaukee, Wis.

May 23-25, 1960
National Lime Association, 58th Annual Convention, The Cloisters, Sea Island, Georgia

June 13-14, 1960
National Limestone Institute Inc., Board of Directors' Mid-Year Meeting, Edgewater Beach Hotel, Chicago

June 26—July 1, 1960
ASTM annual meeting and apparatus exhibit, Chalfonte-Haddon Hall, Atlantic City, New Jersey

October 3-5, 1960
National Sand and Gravel Association, Semi-Annual Meeting, Board of Directors, Del Monte Lodge, Pebble Beach, Calif.

October 10-13, 1960
American Mining Congress, 1960 Metal Mining and Industrial Minerals Convention and Exposition, Las Vegas, Nev.

October 17-21, 1960
National Safety Council, 48th Annual National Safety Congress, Chicago, Ill.

November 3-4, 1960
National Slag Association, Annual Meeting, Hotel Mayflower, Washington, D.C.

INDUSTRY NEWS

(Continued from page 70)

Report asbestos find

A MAJOR DISCOVERY OF ASBESTOS has been made in the Ungava region of northern Quebec. William Cottingham, Mines Minister, announced in Quebec City that a diamond drilling program disclosed the presence of 7 million tons. The asbestos compares in quality, he said, with the yield from the southern region in which Thetford Mines, Asbestos and Black Lake operations are located.

Site of the new discovery is in an area often referred to as the "nickel belt" between Cape Smith and Wakeham Bay.

END

NOW...full-time analysis of materials in actual production

XEG X-Ray Emission Gage watches and measures up to 5 selected elements

Solids, powders, slurries, fluids — General Electric XEG X-Ray Emission Gage examines them as they actually move through production . . . writes a running record of their elemental make-up. XEG tirelessly surveys up to five elements simultaneously, continuously . . . senses both their *presence* and *quantity*. Where practical to operate minus reference, even analyzes a sixth element.

Versatile XEG serves equally well for on-line process control or individual-sample analysis. Scientifically trained operator is not required — because once set for specific analysis, there's little need for further adjustment. XEG then automatically delivers the facts on composition for rapid-fire, continuous feedback to process control.

Applications are as limitless as your imagination. And, whenever you like, we can explore XEG potentials with you. The details are available now from your G-E x-ray representative. Or write us at General Electric Company, X-Ray Department, Milwaukee 1, Wisconsin, for Pub. RP-44.

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HINTS & HELPS

PROFIT-MAKING IDEAS DEVELOPED BY OPERATING MEN

Portable field belts

SEVERAL 30-in. portable field conveyors carry gravel to the semi-portable plant of this Michigan producer. Supporting trusses of his eight 90-ft. field conveyors were home-assembled for low cost. And the conveyors are made to fold in half, for easy shipping between the several pits this semi-portable 300-tph. plant works.

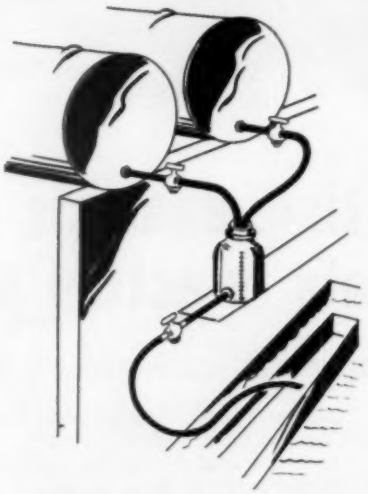
Why use field belts? Well, for one thing, the plant is semi-portable (only part of it on wheels), so can't be quickly moved to each face in a pit. Perhaps more important, the conveyors are cheaper to operate than haul trucks (use little or no manpower when in place; require no haul roads). This technique of moving material from pit to plant seems to be growing in popularity.

Surge pile proves worth

EVER WONDER what's all this excitement about surge piles in stone and gravel plants? Well, here's one Iowa stone producer who cites several good reasons for having a surge pile after his primary crusher:

(1) It gives you a ready supply of partially crushed stone, which can be custom-crushed to meet any special orders which come in. (2) Even though your primary crusher breaks down or you're out of shot rock in the quarry, you've got a supply of stone on hand to meet rush orders and orders from important customers you want to keep. (3) If you've got more capacity per hour in the quarry and primary crusher than in later plant stages, you can stockpile the excess at the surge pile, drawing it down as needed. (4) You can stockpile stone here for winter use, minimizing winter quarry work. During the slow winter months, you won't have to call back a full crew to fill intermittent orders with this setup.

Safe chemical dispenser



BECAUSE OF THE EXTREME alkalinity of the well water used in our plant it must be dosed with sulphuric acid. But handling bulk acid has always been a hazard—until we developed a safer way of working with it.

Tubing leads from the acid carboys into a calibrated container. In this way we can control the rate of flow and, at the same time, accurately determine how much acid will be used. A tube from the bottom of the bottle leads to the water supply system, and a petcock lets us control the rate of flow.

This setup could be used just as effectively for other hazardous chemicals or to meter valuable fluids not necessarily as potent as acids.

Wm. Amons, Oak Ridge, Tenn.

Reclaim tunnels

OLD TANK CARS never die, it seems. Even when they are no longer serviceable for use on the railroad, these old soldiers find new occupations elsewhere. An alert aggregates producer in the Chicago area had an opportunity to purchase a number of these hulks just when he was building a new plant.

It was a simple matter to remove the trucks and cut out the ends of the heavy, riveted steel tanks. Domes not needed for reclaim gates were left in place, and each tank was mounted on concrete piers. Belt conveyor supports are easily bolted to angles welded to the inside of the tanks. This producer lined up two or three units to make his reclaim tunnels. Since they were mounted above ground on piers, ground water does not collect around the tanks.

(Continued on page 78)

Put the EARNING POWER of a **UNIT** in your pit

This one does a man-sized job — has real muscle and speed to give you the power, capacity and output you require to make a profit from your pit operation. UNIT shovels and draglines are dependable producers, whether digging, loading, stockpiling, or dredging. Low original, operating and maintenance costs, *plus* reliable production, mean you *earn more* with a UNIT from each ton of material moved. ■ Here are some important reasons why UNIT is your most profitable choice for an efficient, cost saving excavator. ■ The exclusive, one-piece cast gear case (there's nothing else like it) keeps machinery in perfect alignment and seals out all dirt and moisture for virtually maintenance-free operation. ■ Straight-in-line mounting of the engine and main machinery contributes to the low operating cost by eliminating many wearing parts, reducing friction loss, and harnessing every bit of horsepower. A worm drive transmits the power smoothly — features an efficient, one-step reduction from engine speed to the main machinery. ■ Disc clutches wear evenly for longer life and their smoother operation reduces load shock on the entire power train. ■ Automatic traction brakes provide an instantaneous traction lock on steep grades . . . are quickly serviced because split brake drums allow linings to slide in or out without completely dismantling brake shoes or drums. ■ Your factory-trained UNIT dealer has full information on the complete line of UNIT ½-yd., ⅝-yd. and ¾-yd. excavators. Call him *now* for detailed specifications and price information.

UNIT **CRANE & SHOVEL CORP.**

6409 W. Burnham St. • MILWAUKEE 19, WISCONSIN

SHOVELS ½ to ¾ YDS. DRAGLINES ½ to ¾ YDS.

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MOUNTAIN-MOVING BELT CONVEYORS IN 12th YEAR WITH ORIGINAL IDLERS

Barber-Greene conveyor system still going strong after handling up to 830,000 tons yearly for Blue Ridge Stone Corp.

The Blue Ridge Stone Corp., Roanoke, Va., is blasting, trucking, crushing and conveying away a limestone mountain at the rate of up to 830,000 tons yearly.

After trucks make the short haul moving blasted rock from face to primary crusher, a 4-flight, 4,150-ft. Barber-Greene conveyor system hustles the limestone from quarry floor to finishing plant.

President Abney Boxley observes, "We've increased production more than 30% over our old all-rail haulage method.

"Since our Barber-Greene conveyors became operative in 1948, we've had 12 years of dependable service with minimum maintenance and downtime. Practically all 1,500 original idlers are still in service and belt life has been extremely good.

"By including a 6,000-ton surge pile ahead of the No. 4 conveyor, we can operate the plant for

6,000-ton surge pile at end of 700-ft. No. 3 conveyor keeps finishing plant operating 24 hours after quarry shut-down. Rock is reclaimed on 1,600-ft. belt leading to finishing plant.

After double reduction of stone in quarry, limestone gets fast ride upgrade on 30" belt of 1,600-ft. Barber-Greene Conveyor enroute to surge pile and then to finishing plant. 4-flight system totals 4,150-ft.

as long as 24 hours after quarry operations have stopped if we bulldoze the stockpile."

Get this same lowest-cost-per-ton-mile solution to your material handling problems by calling your Barber-Greene Conveyor Specialist. He sells pre-engineered and pre-aligned standardized conveyors plus broad design experience . . . a combination that is preferred throughout the aggregate industry for hard-dollar reasons.

Send For New Idler Bulletin

New 44-page Idler Bulletin describes the more than 800 units available in the complete Barber-Greene line, tells how their years-ahead features bring longer life and greater economy to every job. Ask for your copy today.

Your belt conveyor equipment headquarters

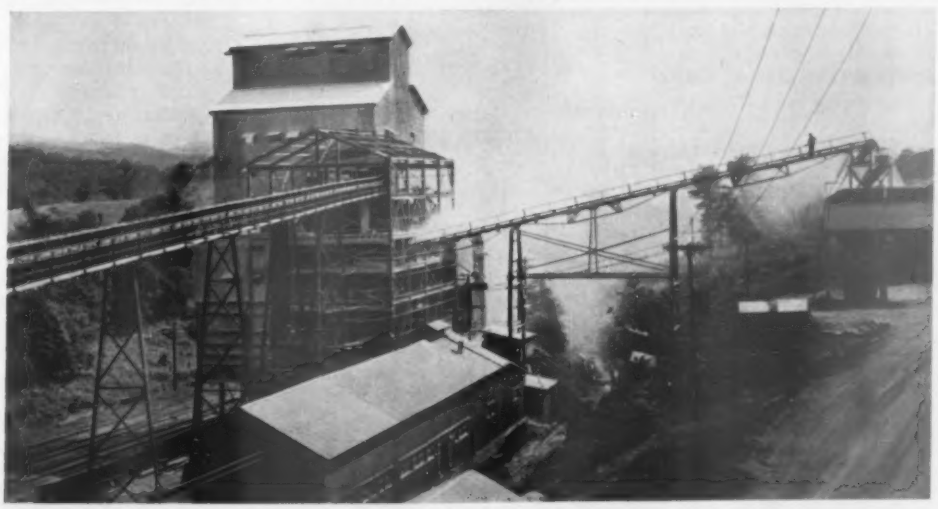
Representatives in Principal Cities of the World

Barber-Greene BG

Main Office and Plant AURORA, ILLINOIS, U. S. A.
Plants in DeKalb, Illinois, Detroit, Canada, England, Brazil, Australia

CONVEYORS • LOADERS • DITCHERS • ASPHALT PAVING EQUIPMENT

Finishing plant is last processing point for stone after 4,150-ft. conveyor ride from quarry. Short conveyor loads truck-loading hoppers. Bulk of output is loaded into railroad cars shown on siding.



(Continued from page 74)

Drop-ball design does make a difference

CRUSHED STONE PRODUCERS in two widely separated parts of the country have found that it pays to match the design of the drop-ball to the work it must do. An eastern producer working in anvil-hard traprock experimented with several "off the shelf" units, only to have the rock shatter them. The problem was overcome with the selection of a long, 6,500-lb. cylindrical forging to do the work.

A western operator found that a pear-shaped ball only made dusty dimples in the slabby limestone he was quarrying. His problem was solved by a round ball with a "point"—a square projection which seems to concentrate the force in a small area.

Contributions? Of course

When we visit rock products plants in our travels we are frequently asked if contributions are accepted for Hints and Helps. The answer is—of course they are.

The editors in the field keep a sharp eye out for a producer's ingenious mechanical inventions but they cannot possibly notice every one. So, if you have a Hint and Help in your plant, feel free to send us a brief description along with a photo or sketch.

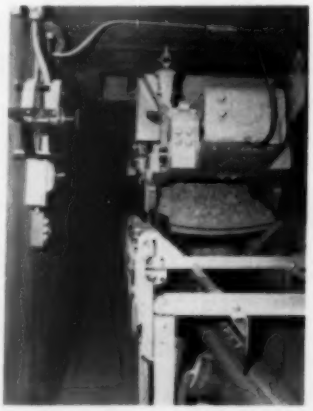
You will then have the satisfaction of helping producers in all parts of the country. And for your helpfulness, ROCK PRODUCTS will send you a crisp green check for $5.00.

Dust analysis helps dust control

MOST ROCK PRODUCTS producers find that they have a double-barreled problem when it comes to dust control. Even after putting in collectors to collect process dust, they find that their plants are dust catchers for wind-blown dust from the countryside.

Portland cement producers seem to lead the way in controlling this nuisance dust. One major cement maker actually samples and analyzes the dust the sweeepers pick up in specific locations around the plant. In this way there is a constant check on the effectiveness of the several different kinds of dust collectors around the plant. This analysis not only gives the plant management an effective tool for internal dust control but a potential public relations technique. If the cement plant is accused of generating dust in the neighborhood, the laboratory report can be an impartial witness to show the relative amount of fines generated by the plant and the amount of dust brought into the community from farmlands, prairies or deserts.

Control feed in tunnel



IT'S TRUE that most aggregates producers prefer to operate vibratory feeders from a central control point. But this is usually determined by the need to make blends of materials already carefully sized.

A southern gypsum processor put his feeder control in the tunnel, right next to the vibratory feeder. The control is a simple, manually operated rheostat. His purpose in having these individual controls is to let the tunnel man maintain a mixture of large, medium and fine gypsum flowing out of storage. Since the sizes can change from hour to hour, only visual inspection can determine what kind of material is going to the screen house from each opening. In this situation, centralized controls would not add to the efficiency of the installation.

Haulage safety

AN UNUSUAL NUMBER of new quarries have posted their roadways "Drive LEFT only." It turns out that they are not laid out by an Englishman, but for very compelling safety reasons.

Visibility proved to be the most frequent reason. Local driving conditions dictated that truck drivers could observe traffic better when the loaded truck was on the left-hand side of the road. At one cement company's quarry, it was considered to be safer if the loaded trucks kept on the side closest to the hill. Then, in event of a runaway, the truck could be steered into ramps cut into the banks without worrying about oncoming traffic.

At another producer's plant, the use of side-dump trucks indicated the need for left-hand driving. These trucks had lips which projected out from the left-hand side of the body. After the trucks had "kissed" only once at high speed, the drivers were only too willing to drive on the left-hand side of the roadway to avoid a repetition.

Reclaim tunnel design

IT'S ALMOST IMPOSSIBLE to change the design and operation of a concrete reclaim tunnel once it is in place—a very good reason for considering carefully what operating problems may come up later.

Water and future expansion are two of these problems. Here's how a western cement plant solved them. The reclaim tunnel was constructed with a reclaim opening about every 10 ft. Then each opening was closed with a concrete block in the shape of a truncated pyramid to exactly fit the sloping sides of the opening. When more reclaim chutes are needed, the blocks are simply removed—a big improvement on making another opening in the tunnel roof with an air hammer.

Water is a problem no longer for this producer. Each reclaim opening is located in the middle of a concrete pad nearly a foot above the grade.

END

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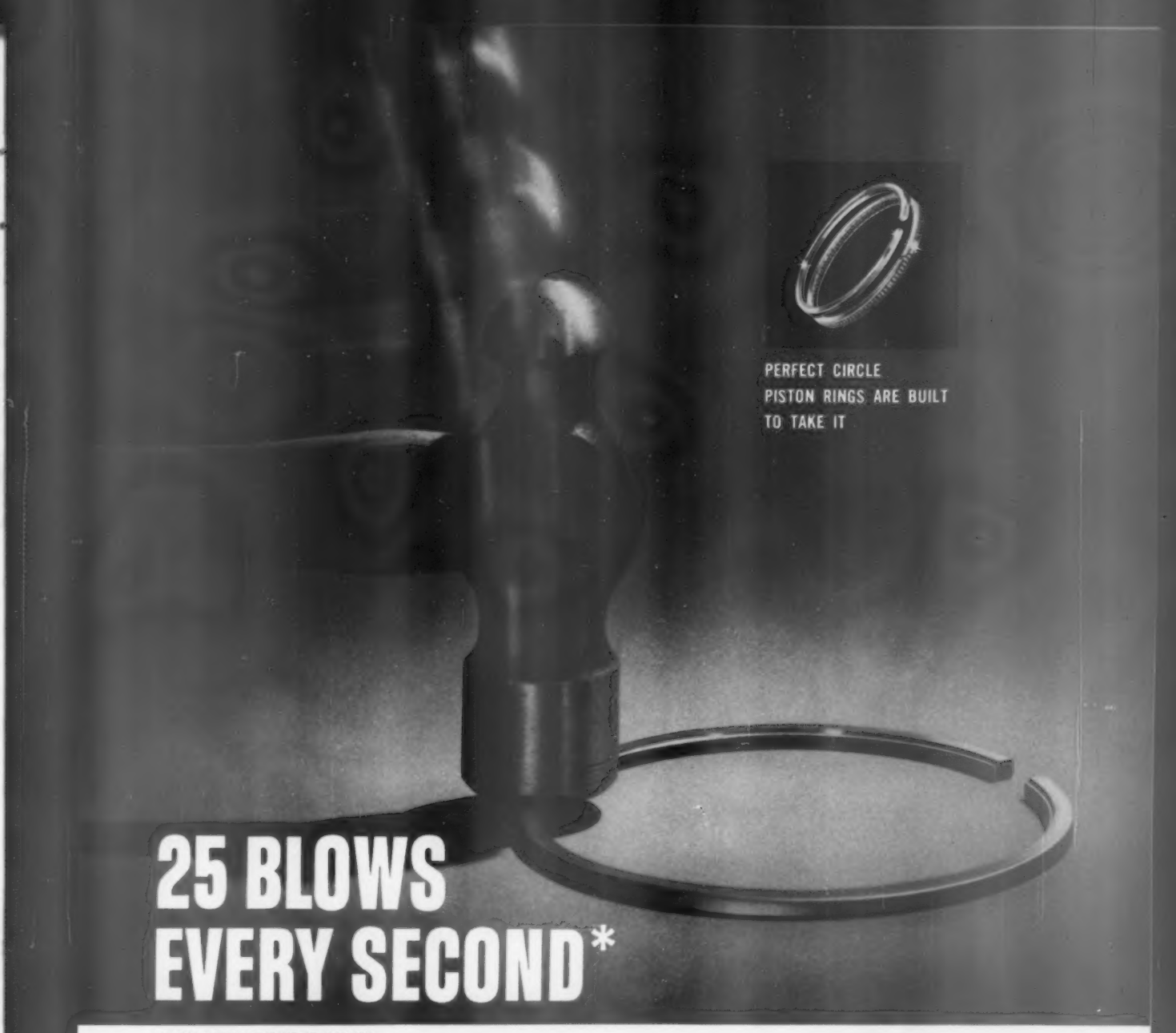

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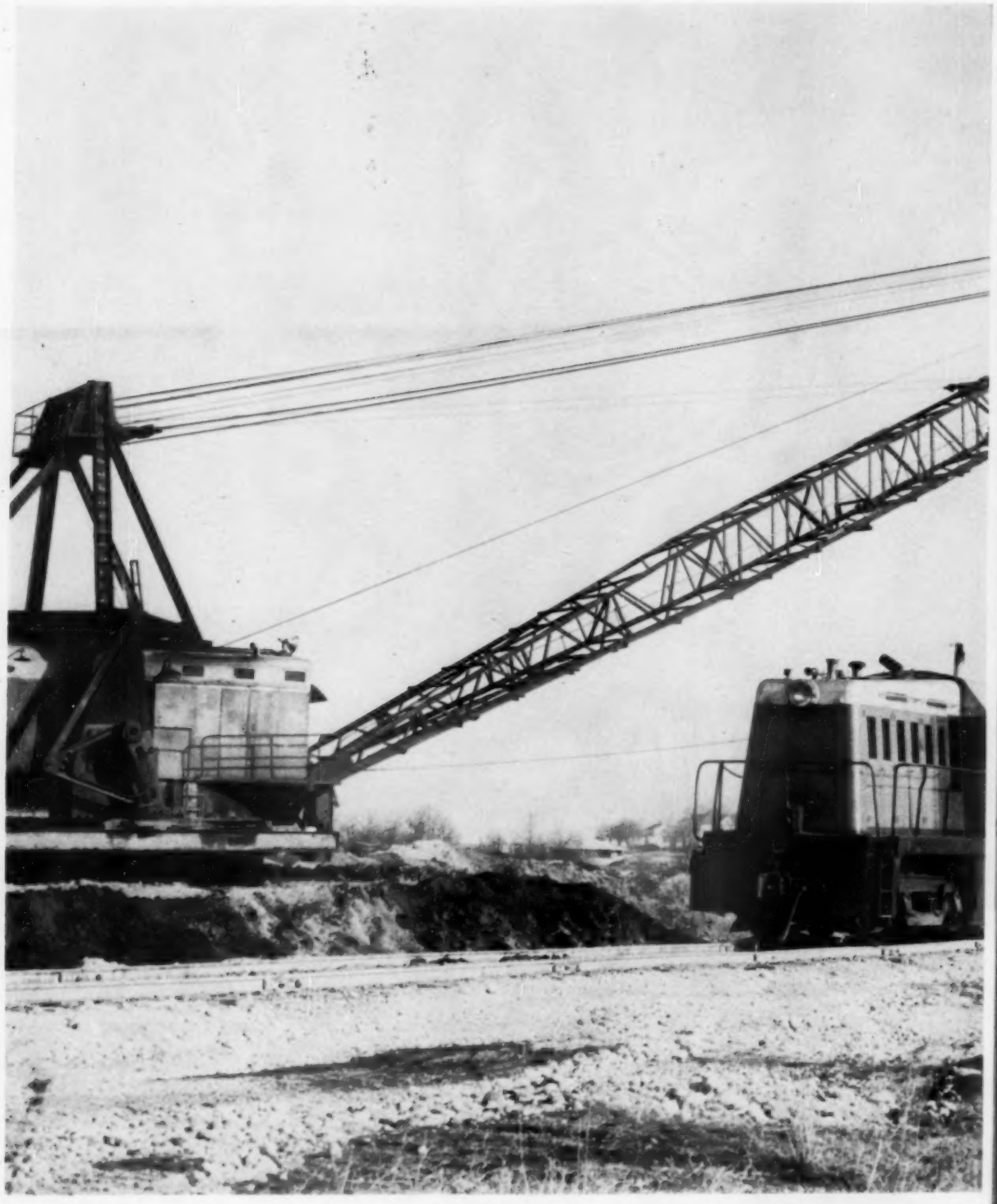

LOCOMOTIVE STANDS BY while a 6-cu. yd. dragline loads 70 tons of sand and gravel into each hopper car

ROCK PRODUCTS
April 1960

Retooled railroad pays off for Material Service

by Ralph H. Lewis

IN THE FACE OF THE CURRENT TREND to giant off-highway trucks and elaborate conveyor systems for moving materials from pit to plant, it is almost an oddity to find locomotives and hopper-type cars doing this job. But this type of materials-handling system is highly satisfactory at one of the most progressive plants in the Midwest—the Lockport, Ill., plant of Materials Service Corp. Daily output of sand and gravel averages 7,000 tons.

The circumstances surrounding this Chicago-area producer's railroad are somewhat unusual, it will admit. It would probably not be economic today to install a brand-new rail haulage system, but it was considered to be very worthwhile to retool the 33-year old railroad. To do this, Material Service recently replaced power plants on five of its nine 65-ton diesel locomotives. The five repowered locomotives haul 11-car trains on round trips of 24 miles. Tonnage was increased 25 percent, and the power conversion has paid for itself in less than a year's time.

The tracks lengthened as pits were worked out and others started, until now the 120-acre borrow pit supplying most of the material is near Plainfield, Ill., and U. S. Route 59. The Lockport plant is on U. S. Route 66A and adjacent to the Chicago Drainage Canal.

The Lockport plant is one of seven similar plants owned by Material Service Corp. in the Chicago

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RETOOLED RAILROAD PAYS OFF FOR MATERIAL SERVICE

continued from page 81

metropolitan area. The entire output of the seven plants approximates 13 million tons annually.

The single-track, 12-mile railroad has a ¾-mile grade of close to five percent. There are two sidings onto which empty cars returning to the pit are pulled so that loaded cars on their way to the plant can proceed non-stop. Normally, four trains are kept busy.

Each 11-car train hauls about 770 tons of bank-run material. That is 25 percent more than they could haul before the new power systems were installed. Before the change in power, the locomotives could pull only nine cars of material. Five trains, instead of the present four, were needed to maintain production. The five trains also required two extra sidings for main-line passing.

All of the nine diesel locomotives used at the Lockport plant were purchased in the early '40s. As only four are needed on the main line, the others are employed in switching, hauling slag from a nearby power plant and for other tasks.

The original diesel engines were replaced on five of the locomotives by a pair of 325-hp. engines that hook up directly with traction generator drives. The company's regular maintenance crews made the installation, which has been instrumental in reducing over-all maintenance costs on each of the five locomotives by as much as $1 an hour. This is while each train has increased capacity by more than 125 tons.

To learn how efficiently this railroad operates, this reporter went along on a routine trip. It took about two hours from start to finish—30 min. each for loading, making the run, unloading and waiting on the siding for passing trains.

I boarded the locomotive at the processing plant where the cars were being unloaded. They were spotted over a single dump hopper beneath the track and dumped by a two-man crew. Dumping is done either mechanically or by air, depending on the vintage of the car. The engineer on my trip was Hobart McCallu, who has been on his present job since 1934.

Seated comfortably in his warm, cozy cab, Engineer McCallu reminisced: "When I started down here, we had nothing but steam locomotives. In addition to it being tough work, the hours were long. The engines were hard to handle and they bounced you around like a rubber ball.

"When the company first purchased the diesels right after World War II, it was like moving from the basement of your house to the front room. I guess I wore out a couple of those diesel engines myself. They were good engines, but the maintenance got bad and they started drinking oil, so they had to be replaced. I don't know who selected these new engines, but it was the right decision.

"Now, we've got plenty of power and more than enough speed. When I get to the pretty steep grades with my load, those engines start to lug down and we keep moving right along. I'd say these locomotives are just about perfect for this job now."

The oncoming train hove into view then. We got the green signal light as the train moved past us and pulled out onto the main line. The diesels were "average" quiet and, although the roadbed was rough, it was not uncomfortable in the cab.

We eased onto our first siding to await an oncoming train. All switches on the main line are spring-operated so it is not necessary to have a man on board throw switches. After 20 min. the loaded train roared by. This siding is on the five-percent grade, and the diesel engines are wide open when pushing the load at this point.

Easing back onto the main line, we took off for the pit. Here, the train was split into two sections of five and six cars each, joined at the middle by the locomotive. This was to speed loading by the two 6-cu. yd. draglines. One dragline is powered by electricity and the other has diesel power. Each can load three cars before the train must be moved. The loading operation was efficient and smooth, with no lost motion and little manpower.

Loading finished, the train was reassembled and the locomotive hooked onto the rear, ready to push the cars back to the processing plant. It was ap-

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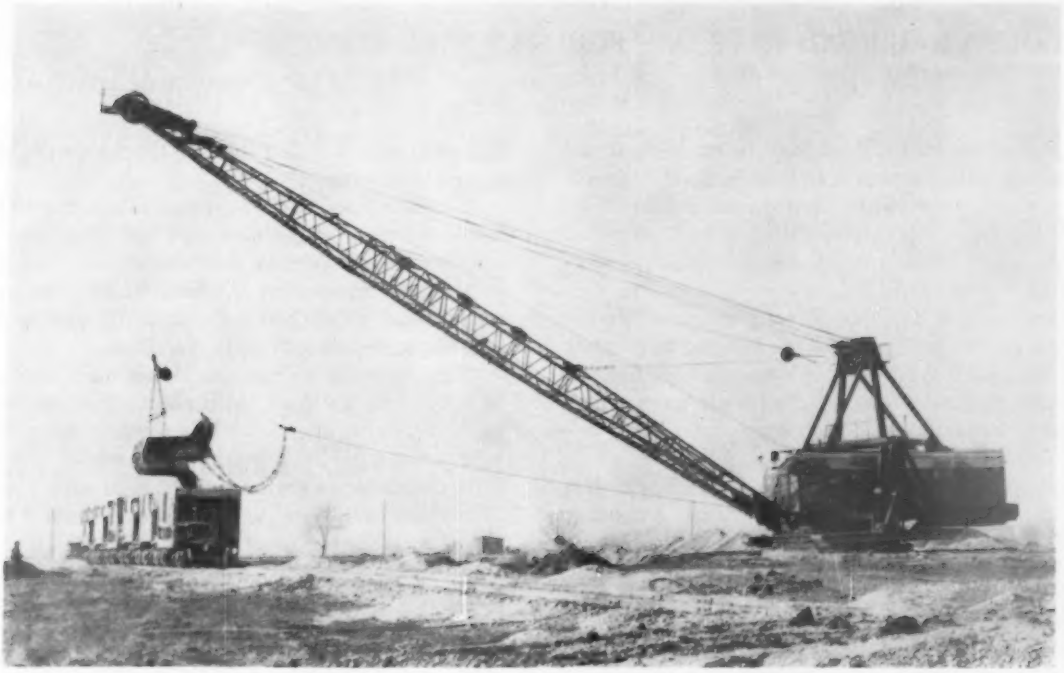


A BIG 6-CU. YD. DRAGLINE in another part of the pit loads another section of the 11-car train

END OF THE LINE is at Material Service's Lemont plant as the big locomotive eases its train into the dumping shed

ONE OF THE REPOWERED LOCOMOTIVES highballs a 700-ton payload 12 mi. across the rolling countryside from Plainfield to Lemont, Ill.

RETOOLED RAILROAD PAYS OFF FOR MATERIAL SERVICE

continued from page 83

parent that we had a good load to push when we moved out onto the main line because the diesels were emitting a steady, deep-throated roar. "We run the engines wide open with a load," informed the engineer. "That's what the engine people recommended we do."

When we hit the five-percent grade with the heavy load, the train slowed up, but not to a crawl. We maintained a steady push all the way back to the plant and rolled up on the dump track where the crew immediately began unloading. The cycle was beginning again.

During off-work hours, the locomotives are stored in a "diesel barn." It is here that a six-man crew does the service and maintenance work required on the rolling stock. They did the conversion work on the engines for the locomotives, averaging about 30 days for each one. The changeover was made in addition to their regular work.

Material Service will concede that the ideal method for transporting material from pit to plant probably would be by conveyor. But the discouraging factor is the capital outlay required to change over from its railroad, which has been in existence since the late '20s. At one time the firm did consider tearing up the railroad and putting in a haul road for off-highway trucks on the existing right-of-way.

A complete survey was made, according to Pope Schoenberger, superintendent of the plant at Lockport, but the cost was prohibitive, compared to the present system. At least thirty-five 50-ton trucks would be needed, with a driver for each, plus expanded maintenance facilities.

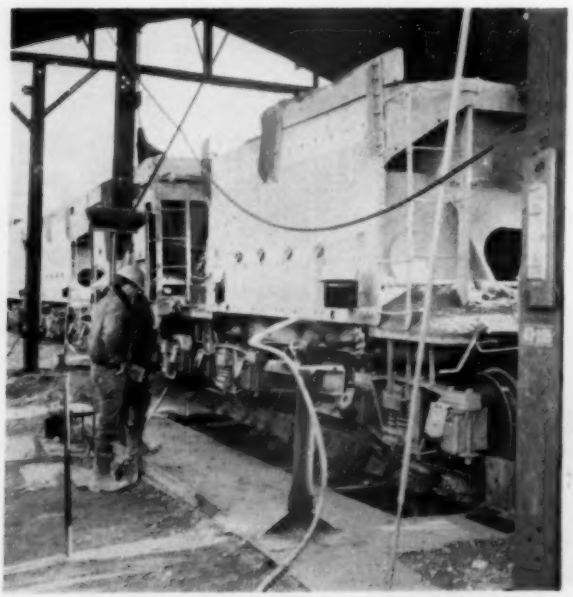
"The railroad we operate down here, compared to a modern railroad, is probably not the best," says Mr. Schoenberger. "But we just keep rolling every day with little maintenance costs. Every 30 min. one of those trains rolls in here with 770 tons of material ready to be processed. We don't worry about weather too much either, with our little railroad. Once in a while a heavy snow slows us up, but not very often. With our train and low manpower to operate it, we don't worry too much about the human element either."

In this day of rising costs and reduced profits, it would appear that Material Service Corp. has a sound, practical method of transporting bank-run material from pit to plant with its fleet of "iron horses." Here is one railroad that has no worry about passenger or freight revenues. **END**

MAJOR EQUIPMENT REFERENCE

Locomotives, 65-ton (9)	Whitcomb Locomotive Co.
Diesel power plants (10)	
D-353 engines, 325-hp.	Caterpillar Tractor Co.
Traction generators	Westinghouse Corp.
Draglines, 6-cu. yd. (2)	Marion Power Shovel Co.

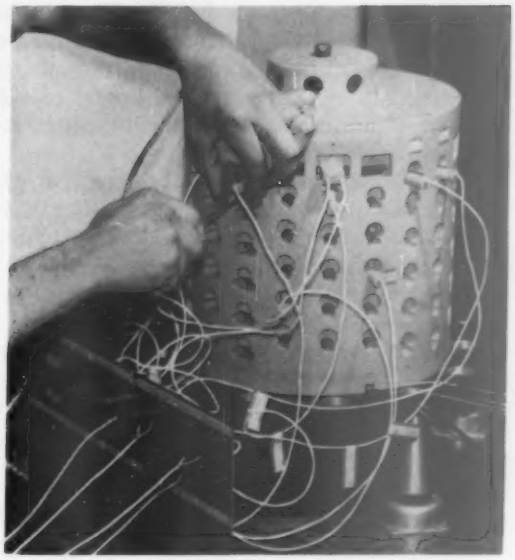
LOCOMOTIVES ARE SERVICED in a shop in the shadow of gravel storage silos. A six-man crew repowered five locomotives in this shop, taking about 30 days on each to complete the job



IT TAKES ONLY A FEW MINUTES to spot each car over the dump hopper, discharge its load and get under way for the return trip

Digital computer at Riverside calculates best mix, points way for efficient operation of quarry equipment

Magic memory solves raw mix problems



COMPUTER'S MEMORY UNIT stores about 8,000 "words." Since only a small portion of this capacity is needed for raw material control, other cement-making processes will eventually be controlled in this way

by Le Roy W. Weeks*

OUR NEW digital computer and linear programming technique has been in operation for several months at Riverside Cement Co.'s Oro Grande, Calif., plant. We've had time to get used to it and discover what it can do. New uses are still unfolding, but of this we are sure: It more than fills its primary purpose of solving raw mix problems.

We expect that our use of the computer in running mix calculations will (1) extend the useful life of our raw material deposits and (2) help minimize quarrying costs. Some of our raw materials are rather variable in chemical composition, as are many deposits of cement raw materials in the West. But we can keep the mix within limits by taking advantage of the accurate sampling system built into our recently installed rock crushing and storage system (see ROCK PRODUCTS, September 1959, p. 116) and performing a new mix calculation when an unexpected variation in chemical composition of any raw material is noted.

Information gained from the computer enables us to schedule quarry operations on both a daily and a long-range basis. This results in more efficient use of drill equipment, power shovels and trucks, as well as of the labor force. And, with such scheduling, we can make optimum use of raw materials with less waste because we cut down on the need to move equipment from one quarry location to another.

The RW-300 computer that makes these operating efficiencies possible is basically a process control computer, but it can be used as a general purpose digital computer. It has a magnetic drum memory of approximately 8,000 words. Each word consists of a fixed point fractional binary number, 17 binary digits plus sign in length. Therefore, each word is approximately equivalent to a five-digit decimal number. Two words are used for each instruction in the program.

Data that is stored in the memory requires only a small proportion of the total available, so we anticipate future use of the remaining storage space for other plant process control. We use a Flexowriter for data input and for printing results. An operator's control panel is used for data input also, and for controlling the sequence of calculations. The computer and the associated control panel are completely transistorized, requiring power of 120 v., 60 cy., and about 1,000 w.

Please turn page

Senior Programmer and Systems Analyst, Riverside Cement Co., Div. of American Cement Corp.

MAGIC MEMORY SOLVES RAW MIX PROBLEMS

continued from page 85

From data fed into the machine by a process which I will explain, we get an optimum solution to a problem that has a number of possible solutions. The method by which this is done is called linear programming. As applied to the mix problem, the method determines the lowest cost combination of materials which can be combined to give a specified raw mix.

Before going further into a description of the computational system, let me assure you that our men at Riverside have had no difficulty learning how to use it. You wouldn't either, if you are familiar with problems associated with quarry operations and with making cement raw mix. You need only a general idea of the computer program and of the actual mathematics involved.

If you read ROCK PRODUCTS' story on our rock crushing and storage facility in last September's issue, you may remember that our storage piles of raw materials for kiln feed are carefully built by a traveling stacker. Layers of materials that have been sampled and weighed form the piles that are 500 ft. long and 36 ft. high.

Samples representing known tonnages of materials that have gone onto the piles are analyzed in the laboratory by standard wet chemical analysis methods or X-ray spectographic equipment. Then, information relating tonnages and chemical analyses is available to use in the computer for mix calculations.

Analyses of materials available for adding to the piles also are needed for the calculations. To supply them, a comprehensive diamond drilling program was completed in the quarry areas. The chemical analysis of the drill core provides general information; besides, samples are taken from blast-hole cuttings, and rapid determinations are made of the total carbonate contents. Together, these results provide complete analyses of materials in the quarry. Purchased materials, such as iron ore, are generally sampled when delivered.

TABLE 1—A typical problem

Holding points:

Tons	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	Alkali
10,000	23.40-23.70	5.30	3.40-3.70	64.50	2.50	.60

Sources:

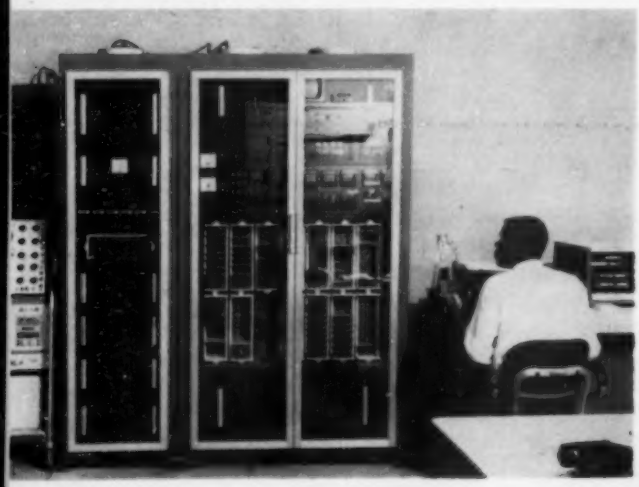
	Cost	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	Loss	Na_2O	K_2O
1	.2	8.80	1.60	.40	49.00	.60	39.25	.05	.30
2	.1	14.30	1.10	.60	46.00	.60	37.25		.15
3	.3	3.80	.90	.30	52.60	.40	41.80	.05	.15
4	.8	59.50	6.50	.30	13.50	3.30	14.45	.05	2.40
5	.1	39.00	13.00	4.80	17.20	5.50	13.80	1.70	1.40
6	.1	29.60	6.10	3.50	29.80	1.80	27.70	.50	1.00
7	.4	35.60	12.90	12.80	11.00	7.20	20.00	.10	.40
8	.5	45.80	15.80	9.00	8.60	4.80	11.30	2.60	2.10

With this information, we are ready to begin our linear program. We set up a problem by specifying proportions of oxides desired in the mix and the chemical analysis and cost of each of the available raw materials. The machine then determines the lowest cost combination of materials that will give the specified mix. If there is no solution with a certain combination of specifications and materials, the computer will tell why. That is, it will show which oxide is not present in large enough percentages in the available materials.

We can specify that in the mix the relative amount of a certain oxide will have a definite value, that it be no more than a certain value, no less, or that it will fall between certain limits. For instance, the following holding points could be set up as the relative amounts of oxide desired: SiO_2 between 23.40 and 23.70; Al_2O_3 exactly 5.30; Fe_2O_3 between 3.40 and 3.70; CaO exactly 64.50; MgO no more than 2.50; Total alkalis as Na_2O exactly .60.

If all of the important components of the cement mix are specified within rather narrow limits, and the relative amounts total approximately 100, these relative amounts are roughly equivalent to percentages. If rather wide limits are specified, or if some important component is not specified in the problem, it may be necessary to include in the problem an equation that insures that the total of loss free materials in the mix add up to 100 percent.

TRANSISTORIZED CONTROL PANEL helps the computer by letting the operator set up the data and control the sequence of operations



SAMPLED AND ANALYZED, raw materials are stockpiled continuously with this traveling stacker to make 35,000-ton piles over 500 ft. long and 36 ft. high

There are various ways of setting up the equations. The problem may be set up in terms of oxides, with any or all of the important oxides specified, and with or without an equation for the total of loss free material. Alternatively, the problem could be set up in terms of cement compounds and oxide ratios. The following holding points might be used: C_3S between 47.00 and 51.00; C_3A between 6.50 and 7.75; SiO_2 divided by (Al_2O_3 + Fe_2O_3) exactly 2.80; MgO not more than 2.50; Alkalis as Na_2O not more than .50; Total: loss-free exactly 100. The method of setting up the equations would depend on the specific needs of any particular cement plant.

Here is the method we use for solving linear programming problems which have been set up with oxide equations: The information needed is read into the computer in the form of data blocks. The Flexowriter may be used to punch the information for a data block on an edge punched card, and this card can then be read by the computer. Or, the information can be read by the computer from toggle switches and decimal switches on the operator's control panel.

We use four types of data blocks. A "source" data block contains the information pertaining to a specific raw material. This includes the source number, the cost and the chemical analysis on an as-received basis. A "holding points" data block contains the tonnage of loss free material desired for a given blending pile and the relative amounts of the various oxides that have been specified.

A "sample tag" data block contains information on a specific amount of material that has been put on a blending pile. This includes the pile number,

Please turn page

TABLE 2—Initial tableau for problem in Table 1

	Const.	1 0.2	2 0.1	3 0.3	4 0.8	5 0.1	6 0.1	7 0.4	8 0.5	100 0.0	101 0.0	102 0.0	103 0.0	104 0.0
0	0.2340	0.0880	0.1430	0.0380	0.5950	0.3900	0.2960	0.3560	0.4580	-0.1000	0.0000	0.0000	0.0000	0.0000
0	0.2370	0.0880	0.1430	0.0380	0.5950	0.3900	0.2960	0.3560	0.4580	0.0000	0.1000	0.0000	0.0000	0.0000
0	0.0530	0.0160	0.0110	0.0090	0.0650	0.1300	0.0610	0.1290	0.1580	0.0000	0.0000	0.0000	0.0000	0.0000
0	0.0340	0.0040	0.0060	0.0030	0.0030	0.0480	0.0350	0.1280	0.0900	0.0000	0.0000	-0.1000	0.0000	0.0000
0	0.0370	0.0040	0.0060	0.0030	0.0030	0.0480	0.0350	0.1280	0.0900	0.0000	0.0000	0.0000	0.1000	0.0000
0	0.6450	0.4900	0.4600	0.5260	0.1350	0.1720	0.2980	0.1100	0.0860	0.0000	0.0000	0.0000	0.0000	0.0000
0	0.0250	0.0060	0.0060	0.0040	0.0330	0.0550	0.0180	0.0720	0.0480	0.0000	0.0000	0.0000	0.0000	0.1000
0	0.0050	0.0024	0.0010	0.0015	0 0161	0.0261	0.0115	0.0037	0.0398	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	-0.2000	-0.1000	-0.3000	-0.8000	-0.1000	-0.1000	-0.4000	-0.5000	0.0000	0.0000	0.0000	0.0000	0.0000
	1.2710	0.6984	0.7760	0.6225	1.4451	1.2591	1.0505	1.2827	1.4278	-0.1000	0.1000	-0.1000	0.1000	0.1000

TABLE 3—Final tableau for problem in Table 1

		1	2	3	4	5	6	7	8	100	101	102	103	104
7	0.1685	0.0000	0.0000	0.0154	-0.3840	0.0000	0.0435	1.0000	0.0000	0.0000	-0.0491	-0.5859	0.0000	0.0000
100	0.0300	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	0.0000	0.0000	0.0000
1	0.8145	1.0000	0.0000	1.5383	-5.0384	0.0000	-0.7563	0.0000	0.0000	0.0000	-1.3198	-0.2014	0.0000	0.0000
2	0.4700	0.0000	1.0000	-0.4412	5.3059	0.0000	1.3298	0.0000	0.0000	0.0000	1.3679	-0.3372	0.0000	0.0000
103	0.0300	0.0000	0.0000	-0.0010	0.0015	0.0000	-0.0002	0.0000	0.0000	0.0000	0.0007	1.0010	1.0000	0.0000
8	0.0520	0.0000	0.0000	0.0793	-0.3779	0.0000	0.1494	0.0000	1.0000	0.0000	-0.0535	-1.6960	0.0000	0.0000
5	0.0356	0.0000	0.0000	-0.1938	1.5244	1.0000	0.2263	0.0000	0.0000	0.0000	0.1619	2.6985	0.0000	0.0000
104	0.0070	0.0000	0.0000	0.0266	-0.0508	0.0000	-0.0791	0.0000	0.0000	0.0000	-0.0278	-0.2100	0.0000	1.0000
	0.3074	0.0000	0.0000	-0.0100	-1.4766	0.0000	-0.0034	0.0000	0.0000	0.0000	-0.1577	0.8865	0.0000	0.0000

MAGIC MEMORY SOLVES RAW MIX PROBLEMS

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the tonnage and the chemical analysis on an as-received basis. A "pile" data block contains information on a certain pile. This includes the pile numbers, the total tonnage on the pile and the equivalent tons of each oxide that have been put on the pile.

Before a pile is started, a problem is set up with the holding points as specified for this pile and the sources that are available. Given the solution, quarry operating personnel work out a schedule for hauling the materials that have been designated. As the material is being put on the pile, samples are taken and tonnages are measured.

At any time during the building of a pile a new problem can be set up to determine the materials needed to finish it. This may be necessary because a certain material hauled from the quarry had a different chemical composition from that predicted, because a certain type of material is no longer available or because additional materials have become available. The new problem would be set up with holding points that have been calculated by the computer from the original holding points and from the current pile data block.

The calculation of material needed to finish a pile is usually made early in the morning, using analytical data which laboratory personnel have derived during the night shifts. The solution to the problem can then be used in scheduling quarry operations during that day.

The linear programming problem is solved by the computer using the simplex method and the artificial basis technique. For a discussion of the mathematics involved in linear programming, see a text on the subject such as "Linear Programming, Methods and Applications" by Saul I. Gass, or "Mathematical Programming" by N. V. Reinfeld and W. R. Vogel.

The information used for a typical problem is shown in Table 1. In solving the problem, these numbers are arranged in a tableau as shown in Table 2. The column labeled "Constants" contains the percentages specified in the holding points. Each of the columns labeled 1 to 8 contains the chemical analysis of a raw material. The percentages of SiO_2 and Fe_2O_3 are entered twice because ranges are specified for these oxides.

The columns headed 100 to 104 represent "slack" materials. These are fictitious materials that contain one oxide only and are used by the mathematical method to allow the percentages of actual oxides in the solution to be different from the percentages specified as upper or lower limits.

TABLE 4—Answer to problem in Table 1

Optimum Solution	
Source	Tonnage
1	8145
2	4700
5	356
7	1685
8	520
100	30
103	30
104	7

Cost: 0.3074

TABLE 5—Additional solutions to problem in Table 1

Solution No. 2		Solution No. 3	
Source	Tonnage	Source	Tonnage
1	9336	1	8108
2	2605	2	1643
6	1584	3	1384
7	1616	6	2766
8	286	7	1543
100	30	100	30
103	30	103	30
104	16	104	21
Cost: 0.3079		Cost: 0.3096	

The second row of the tableau shows the cost of each material. The two bottom rows are calculated from the other numbers and are used to guide successive steps in the calculations. Each row in the tableau (except the first two) represents an equation. For instance, the third row represents the following: $8.8X_1 + 14.3X_2 + 3.8X_3 + 59.5X_4 + 39X_5 + 29.6X_6 + 35.6X_7 + 45.8X_8 - 10X_{100} = 23.4$

With the simplex method, we calculate a new number for each entry in the tableau to get a second tableau. The same process is carried out successively until the computer arrives at the lowest cost solution. The final tableau of this problem is shown in Table 3. The answer is printed by the computer as shown in Table 4. We can obtain the answer to a problem of this size in from 10 to 30 minutes. A person using a desk calculator would require about two days to solve the same problem.

Our computer program allows considerable flexibility of operation when solving linear programming problems. Speed is important when production problems are being run. It is not necessary to print out the tableaus—only the answer need be printed. We can set switches on the control panel for printing all tableaus or for certain ones.

For certain problems, we think it is desirable to set the switches for the first and last tableaus.

The first tableau gives us a written record of the data going into the problem, and the last tableau reveals information regarding the second lowest cost solution. For problems related to research on raw material usage, we may want to set the switches to print all feasible tableaus, since each of these is actually a solution to the mix problem, although not an optimum solution. We can halt the computer after a tableau printout and then select manually the next material to be put into the solution. We find this feature useful when we want to explore all of the possible solutions to a problem.

The final tableau, Table 3, shows that if source 6 were used instead of source 5, the cost would be increased slightly. This is indicated by the small negative number, .0034, in the bottom row of the source 6 column. If source 3 were used, the cost would be increased a little more. Two additional solutions to the problem are shown in Table 5. These were obtained from tableau printouts that are not shown.

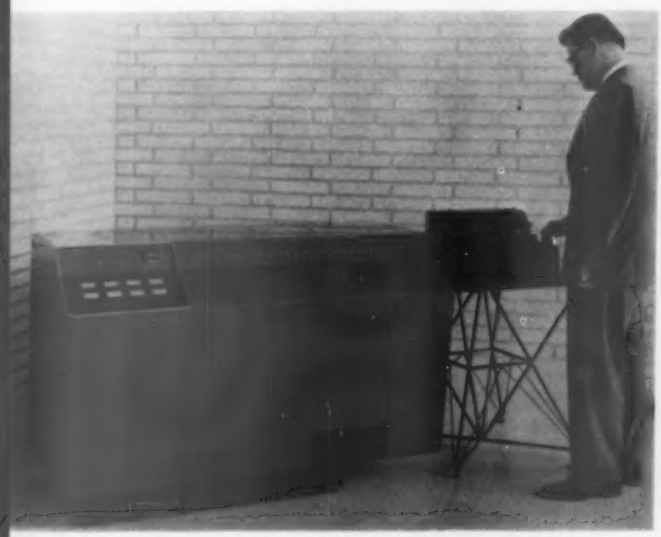
Since our computer has a fixed word length of 17 binary digits plus sign, some care was necessary in writing the computer programs so we would get enough accuracy. The initial data are stored in such a way that the computer accuracy is greater than the four places of the data. All data numbers are used as fractional numbers from .0001 to .9999. The chemical analyses are considered to be fractional parts, rather than percentages. The cost figures are relative only, and numbers less than one are used.

A value of 1.0 is usually used for the slack vectors in linear programming, but we have found that when this value was used, many of the derived numbers were large. A value of .1 is used for the slack vectors. This helps to keep the size of the derived numbers rather uniformly small.

The problem could be started using the data as it is initially stored, but this would require that all derived numbers be less than four. Experience has shown that if the data be shifted so that derived numbers may be as large as 32, the accuracy is satisfactory. And most problems can be solved on the first try. If a derived number is calculated and found to be larger than is allowable, the data are automatically shifted so that derived numbers of twice the former size are allowable and the problem is started over. The results of most of the arithmetical operations are rounded, rather than chopped; this increases the accuracy.

The computer won't relieve you of the responsibility of making decisions. But, by performing complex mathematical computations quickly and accurately, it will give you more information to help in making decisions. Without it, you have to base your decisions largely on estimates and past experience. END

EQUIPMENT REFERENCE: *Maker of the RW-300 digital computer is Thompson-Ramo-Wooldridge Products Co.*



THE DIGITAL COMPUTER itself is no larger than an office desk. A Flexowriter prepares punched information on a card which the computer can "read"

RIGHT: Use of computer enables Riverside to make more effective use of shovels and trucks in the quarry, to even out variations in raw materials

St. Paul producer retools crushed limestone plant to maintain supremacy in market area

SHIELY GIRDS FOR MARKET SUPREMACY

by Kneeland A. Godfrey, Jr.

THE J. L. SHIELY CO., veteran crushed stone producer of St. Paul, Minn., had strict specifications of its own when revising its plant setup—no deviation would be permitted from top-quality product and high labor efficiency. And the company had something to show for its insistence: a highly impressive, 180-tph. plant needing only 12 men, compared to the old, 110-tph. plant that required a crew of 30!

It is certainly a more economical operation. Here are four ways the firm is keeping costs down (a move dictated at least partly by the recent influx of new producers):

(1) In the quarry, one 3-in. crawler drill is replacing three 1¾-in. wagon drills. Manpower requirement has been cut from five to two.

(2) Efficiency has been added to the excavating-hauling operation by using one larger (2½-cu. yd.) electric shovel in place of a 2-yd. Further, the dozer operator now doubles as oiler on the shovel; this is possible since both are only part-time jobs. This revision saves one man.

(3) In the old, admittedly outmoded plant (designed in 1940), a man was required to watch each screen and crusher to minimize jams and unwanted surge loading. In the new plant, one man controls the entire operation. He can shut off the entire processing operation in an emergency.

(4) Loading out is as mechanized as possible. Two men load out the entire day's production of 1,500 tons in their spare time. It takes them about 1½ hr. The load-out system is tied into the firm's existing barge-hauling operation. Because Shiely's yards in the St. Paul area are all on waterways, this was a natural. And because much of the firm's production is consumed by its ready-mix concrete plants on several of the yard sites, this portion of production needs no rehandling from the yards.

QUARRY EFFICIENCY starts with a new air-powered crawler drill which replaces three smaller units. Drilling labor has been cut from five men to two

Here's a more detailed breakdown of how each improvement fits into the plant's processing setup. In the quarry, the new 3-in. crawler drill is operated by two men. Net labor saving: three men. Further, the two-man crew must work only an 8-hr. shift to get the job done today, whereas previously the job often required 12-hr. shifts. Part of the reason for the labor saving is, of course, that a bigger drill can get by with fewer holes, since more powder can be put in each. But a second important reason for better labor productivity is this: Chips are blown out of the hole by air pressure with the new unit. This means the drill needn't grind away at material already broken up. Shiely reports that the new drill will pay for itself in about 12 operating months, in labor-saving alone!

Three haul trucks carry shot rock from the shovel to the primary impact breaker. Their design is evidence that a big aggregates producer is always looking for ways to save money. Shiely's men did quite an ingenious thing here in making three side-dump wagons. They used available materials—the chassis from bottom-dump wagons and the bodies from rear dumps—and by turning the bodies sideways, got side-dump wagons. This setup gives the simplest dumping arrangement possible, for only one hoisting setup is needed instead of hydraulic cylinders or gates on each truck. Too, the wagons needn't turn around, as

Please turn page

HOME-PLANNED HAUL UNITS and dump mechanism bring stone to the newly popular twin-shaft 4350 impactor. Side-dump trucks are made using rear-dump bodies mounted on bottom-dump chassis

VICE PRESIDENT R. C. SHIELY observes the operation of the plant's final processing station. A row of 500-ton bins straddles a blending belt; shuttle conveyor for barge loading is at far end of the five bins

THE STRAIGHT LINE PLANT has no surge storage pile but features a small surge bin and mid-plant truck bin for removing fines

BARGES of crushed stone are cast off for delivery along the Mississippi River waterway

SHIELY GIRDS FOR MARKET SUPREMACY

continued from page 91

do rear dumps, and needn't use a drive-over hopper, which is hard to clear in case of a jam.

Shot rock is broken down quickly and efficiently by the 4350 primary impact crusher. The choice of an impactor has proven to be a good one, and follows a trend to the use of this type of crusher in low-silica limestone. In such materials, operating and hardfacing costs have been lowest of several types of crusher, according to some reports. And because the softest rock breaks down more than the harder, the impactor serves as a beneficiating device. Shiely can eliminate this soft, weak stone at the primary screen in the fines fraction. It is used as base and driveway rock, applications having less strict specifications than concrete stone.

The surge hopper has two important functions. First, it serves to smooth out the often erratic flow of rock from the primary, caused by haul trucks dumping at intervals. This smoother flow reaching succeeding plant stages means each piece of equipment can be worked to nearer its capacity, but won't be overloaded.

Second, the surge bin is an efficient means of keeping most of the plant working, even with a temporary rock-jam at the primary, or such a delay as a broken shovel cable. The 180-ton bin holds at least enough to keep succeeding stages working half an hour, reports Robert C. Shiely, vice president for operations.

Why not use a surge pile-reclaim tunnel combination? Mr. Shiely was aware that a very big, expensive setup would be required to keep the plant going in case of serious equipment breakdowns. Repair time is simply too long. The cost of a setup adequate for such purposes is not warranted in this operation. Too, there's a great deal of "dead" stone in a surge pile. Being cheaper, the surge bin was decided on as satisfactory for most jobs required of a surge setup.

Next in line in this straight-line plant, Station C consists of the primary scalping screen, secondary cone crusher and a truck load-out bin. Screen and bin are the units employed to rid the high-grade stone of deleterious fines. Material trucked from here to ground stockpile is reclaimed by a tunnel-belt combination; trucks loading out here service the plant's area, about 25 miles south of St. Paul. Oversize from the scalper drops to the secondary crusher, a 4¼-ft. standard cone. This type of unit is perhaps the most common of any type used as secondary in large stationary plants. It is placed in open circuit at the Shiely plant.

Careful use of the latest design techniques and a novel adaptation of existing equipment have cut both labor and capital equipment costs for J. L. Shiely Co. at the 250,000-tpy. operation

The final station, D, is carefully designed to permit blending of sizes, recrushing and loading out with only one or two men. Here is the setup: Five bins, of 500 tons capacity each, dominate the station. But three final sizing screens, sitting on top, and a tertiary impactor for recrushing are important, too.

The setup is straightforward. After being sized by the screen and carried to the appropriate bins, stone is blended to meet any orders. Three adjustable gates beneath each bin make blending an easy precise operation. The blending belt running beneath the row of 15 gates collects the sizes chosen, and carries the mix out to waiting barges at the river nearby. Here, a shuttle-type conveyor simplifies the job of filling the barges from side to side; two barge pullers make for quick and sure spotting lengthwise.

But that's not all the operator can do at this station—he also can boost his supply of short sizes or eliminate a surplus of another size. Equipment required: the tertiary impactor, used for recrushing, and a second belt running the length of the five big bins. The conveyor moves the size to be recrushed to the impactor. Impactor product is then recycled to the main belt feeding Station D.

That's the story of one of the more interesting new crushed stone plants in the nation. Careful use of the latest design techniques and a novel adaptation of existing equipment have cut both labor and capital equipment costs for J. L. Shiely Co. at the 250,000-tpy. operation. END

MAJOR EQUIPMENT REFERENCE

IN THE QUARRY:

Crawler drill, Airtrac, 3-in. holes	Joy Manufacturing Co.
Air compressor	Gardner-Denver Co.
Swing shovel, (54-B), 2½-cu. yd.	Bucyrus-Erie Co.
Dozer, D7	Caterpillar Tractor Co.
Side-dump wagons (3), 12-ton	Euclid Division, GMC (J. L. Shiely conversion)

IN THE PLANT:

Side-dump mechanism	J. L. Shiely Co.
Primary crusher, 4350 impactor	Iowa Manufacturing Co.
Scalping screen, 4 x 16-ft.	Hewitt-Robins
Secondary crusher, 4½-ft. std. cone	Nordberg Manufacturing Co.
Final sizing screens (3)	W. S. Tyler Co.
Impactor for recrushing	Stedman Foundry & Machine Co.
Shuttle conveyor (barge loading)	J. L. Shiely Co.

Gyratory cuts crushing costs in portables

A gyratory crusher serves as secondary breaker at this portable plant, cutting costs with high reduction ratio and low maintenance

COURTNEY & PLUMMER, Neenah, Wis., aggregates producer, is cutting costs and neighbors' complaints with ingenious improvements in the design and operation of its five plants. Never afraid to try something new, the million-ton-per-year firm has:

(1) Installed a gyratory or cone crusher as the second of three breakers in one of its portable operations. This unit, despite its higher first cost, gives a lower cost per ton of rock produced because of greater reduction and low maintenance costs.

(2) Boosted life of screen cloth on one vibrating screen from 2 months to 18, by switching from ordinary wire cloth to a special-analysis manganese-steel alloy.

(3) Eliminated neighbors' complaints of crusher noise at one stationary plant. A high wood wall, cheap but effective, not only eliminated complaints, but serves as a windbreak during windy Wisconsin days.

The gyratory crusher, a 48-in. unit, has several advantages which combine to more than offset its higher initial cost. For example, the crusher reportedly permits a greater reduction in size than

do the rolls often used as secondaries in portable operations. Courtney & Plummer find they can reduce 4 to 5-in. stone down to ¾-in. product, depending on raw material. This reduces the number of crushing stages needed to make spec. stone.

Two other highly important advantages of the gyratory, the owners have found, are its lower maintenance costs and its cubical product. Because the manganese-steel wearing parts are designed to wear down evenly, they keep their original shape till very thin. Little valuable manganese-steel is wasted as a result. The cubical product pleases contractors and the state highway department who dislike slabby pieces.

While the gyratory or cone crusher is perhaps the "standard" secondary breaker in stationary plants, it hasn't been used widely in portable plants because of its greater weight, high head requirements and high initial cost. For the first two reasons, the gyratory does limit the number of pieces of equipment that can be mounted on a portable unit.

But Courtney & Plummer liked the savings the gyratory promised, and asked that one be installed in a portable plant it ordered. The fact that three pieces of rolling equipment would be needed didn't particularly bother President Earl Plummer. For one thing, he notes, fewer items of processing equipment on a portable make for better accessibility and quicker servicing and repair. The crusher has fully met with expectations, he reports. In fact, the installation has started a trend, for the plant's maker reportedly has since put big gyratories on a number of other portable plants.

Setup of the three portable sections is simple. First unit in the 250-tph. plant incorporates a 25 x 36-in. jaw crusher, fed by an apron feeder. Mounted on the second section are a 4 x 8-ft. scalping screen and the precedent-setting 48-in. gyratory. The screens get the most from the crusher by removing fines from its feed. The secondary takes 1½ x 4-in. material, reducing it to minus 2 inches.

Final processing is handled at the third portable which contains a 30 x 26-in. roll crusher and twin-deck 4 x 12-ft. flat screen. The rolls make extra fines needed on many jobs.

A surge hopper and truck-loading belt comprise the fourth and last portable section. The hopper permits smooth, fast truck loading, despite irregularities in flow of finished material from the plant, and despite truck movements to and from the discharging belt.

Improved screen cloth is saving money at the portable plant. The firm's Harold Mulvey reports that first cost is not the correct basis on which to judge the true value of various screening materials; instead he uses the cost per unit of production. In other words, he figures in the life of a unit as well as first cost to get true cost.

Taking breaker-run 4-in. material from the primary jaw, the 1½-in. cloth was wearing out after just two months, or less than 100,000 tons of production. The cloth, of ordinary-grade steel wire, wore out at the spot where the rock first struck it.

Then, after talking with a manufacturer's representative, Mr. Mulvey agreed to try a special-analysis manganese-steel cloth. It cost roughly twice as much. But cloth life was boosted to at least 18 months, a nine-time gain. So cost per ton

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HERE'S THE ENTIRE PORTABLE SETUP. Primary jaw section is just off to the left, then comes gyratory section, roll section and surge hopper

GYRATORY CUTS CRUSHING COSTS IN PORTABLES

continued from page 95

BIG 48-IN. GYRATORY dominates the second processing unit of the plant. Screen set ahead of it removes fines, cutting feed to the crusher and boosting capacity

HIGH WALL behind the crushers screens out the worst of the objectionable noise which had been bothering neighbors

WASHING PLANT is neat, compact. Scrubber, washing screen and sand screw-classifier all nestle in this tower which also supports the four radial stackers

of material processed was cut to no more than a fourth the former level.

The wood high-wall is the final problem-solver. The firm's new stationary crushing plant at Neenah headquarters uses a 9 x 30-in. jaw crusher and 30 x 20-in. rolls, in closed circuit, to break material down to minus 1 in. The installation is neat and effective.

But homeowners moving out ever nearer the suburban plant had started complaining about the noise, particularly noticeable when the wind was from the west. Courtney & Plummer solved the problem neatly by erecting a high wooden wall on one side of the two crushers.

This new stationary plant does a good job of washing its gravel and sand products, for much of production goes to the adjacent ready-mix concrete plant of Twin City Transit Mix Concrete Co. At this wash plant, three units clean both sand and gravel. First in line comes a 72-in. diam. scrubber to loosen fines caked on the gravel and break up clay lumps. Scrubbed sand and gravel drops to a flat twin-deck screen, fitted with spray bars, which makes the final separation and gives the gravels their final washing. They now move out over radial stackers to stockpile.

Thanks to a split deck, the twin-deck screen makes four products. These are 1½-in. No. 2 gravel, ¾-in. No. 1 gravel, ⅜-in. roofing or pea gravel, and minus 4-mesh concrete sand. Sand fraction gets one final processing step, for dewatering and removal of silt, in a 19-ft. screw classifier.

Each product travels out to stockpile on a belt leading from a corner of the wash plant. The home-designed stacker conveyors are ingeniously made: Each is mounted on a swivel, and held up by wire rope. In this way, designer David "Jim" Courtney achieved a radial stacker without legs to interfere with mobility of operations on the ground beneath. **END**

MAJOR EQUIPMENT REFERENCE

PORTABLE PLANT

Power shovel, 1-cu. yd.	Manitowoc Engineering Corp.
Dozer, stripping, D8	Caterpillar Tractor Co.
Scalping screen, 4 x 8-ft.	Iowa Mfg. Co.
Screen, 4 x 12-ft. twin-deck	Iowa Mfg. Co.
Primary jaw crusher 25 x 36	Smith Engineering Works
Secondary crusher, 48-in. Gyrasphere	Smith Engineering Works
Tertiary crusher, 30 x 26 roll	Smith Engineering Works
Plant design, construction	Smith Engineering Works

STATIONARY PLANT

Primary crusher, 9 x 30 jaw	Smith Engineering Works
Scrubber, 72-in. dia. Super Scrubber	Smith Engineering Works
Sand classifier. 24 in. x 19-ft.	Smith Engineering Works
Scalper screen, 4 x 8-ft. 2-deck	Iowa Mfg. Co.
Washing screen, 4 x 12-ft. 2-deck	Iowa Mfg. Co.
Secondary crusher, 30 x 20 roll	Lippmann Engineering Works

Conflicting laws and rules baffle managers and operating executives at the NCSA convention in Chicago

Producers thread maze of regulations

SELDOM has the National Crushed Stone Association been as successful to plan a well-rounded program and to round up the outstanding speakers for it as at the recent 43rd annual meeting in Chicago. Result—overflow crowds of attentive listeners at virtually every session. Nor was the program permitted to get into a rut at any time, for the sequence of speakers and movies was planned to give a refreshing change of pace.

Production problems took the limelight at most sessions—just what nearly 2,000 producers and manufacturers' representatives expected to hear when they came to the Conrad Hilton on Feb. 22 through 24. Safety problems took up another major part of the discussions as did outstanding speakers on topics of wider interest. But possibly one of the most dynamic sessions of the whole convention was "NCSA in Action," which included the President's report, the Staff report to the membership and a pair of outstanding film presentations.

Service to members is the goal that NCSA approaches with vigor. Warren C. Rowe, president, reported that he was impressed with the enthusiasm and energy that the organization has shown in giving real service. He noted that membership of NCSA is at an all-time high of 170. The Engineering Department has been expanded and broadened to provide even greater help to members during 1960. The Manufacturers Division extended its efforts this year to give the biggest and

Please turn page

CHALLENGING SPEAKERS stimulated great interest and lively discussion. Julian Parton (second from left) elaborates a point from his paper on drilling costs

ALMOST EVERY MEETING at the NCSA convention featured overflow audiences. Even the grand ballroom of the Conrad Hilton was comfortably filled for the session on production

THE COVETED NCSA SAFETY AWARDS were on display before the luncheon at which they were awarded

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best equipment show ever held by NCSA. All available space in the Conrad Hilton was occupied.

Picking up the service theme where Mr. Rowe left off, Executive Director J. R. Boyd highlighted the many ways that the association renders service and protects members' interests. Information on current and pending legislation important to the industry is quickly sent out from the Washington office. When considered in the best interests of the industry, testimony on proposed legislation is given before Congressional committees.

That's only part of it. NCSA has cooperated with government agencies in projects designed to benefit the crushed stone industry. This past year, no less than three major cooperative projects were carried out with the U. S. Bureau of Mines. In addition, communications between the Washington office and members is a continuous project. Efforts here include the Crushed Stone Journal, executive letters sent out on various subjects by Mr. Boyd, engineering reports, letters from the association counsel, and special publications.

Engineering staff and facilities are now better balanced to give improved service to members in both the service engineering and research engineering phases. There is no longer a field engineer. He has been replaced by additional staff engineers. The organizational chart has been revised to allow an equal division of time and work on service testing and research projects. A few months' operation under the new system has proved that the change was a good one, for members' requests for aid are being handled currently without letup in valuable research work.

Engineering Director J. E. Gray reported on many types of service testing being done for members and on research projects that are important to the industry. Notable among the latter is a program to study dense graded aggregate as a good base for roads. According to Mr. Gray, this is probably the market that provides the greatest possibility for the increased use of crushed stone. It is considered so important that NCSA has prepared a color film to promote such use of stone. The film is a professional job, though all the work on it, including the sound, was done by NCSA staff members. It most effectively points up the importance of uniform gradation and moisture content of material used on such a job.

Tomorrow, today's modern accomplishments will be as worn out as an old shoe. It's a fact, according to J. Lewis Powell of Washington, D.C. And it presents the biggest problem that management has had to face in 50,000 years. He emphasized that, despite all the recent fantastic advances in science and technology, top management still doesn't have electronic brains to help it make big decisions. "Everything that gets done still gets done because executives make sound decisions," he said. "Therefore, in a world of tremendous change, mature executives can no longer afford the luxury of being mentally geared to the past."

Mr. Powell's presentation of "Cave Man to Space Man" was loaded with cracker-barrel humor, though his theme—"think about tomorrow"—is as profound as they come. His humor, plus presentation gimmicks and pointed comparisons, made it impossible to forget the serious points he wanted to get across.

From management philosophy to safety programs was an easy jump for the fast-paced program. Feature speaker at the Greeting Luncheon was Paul Jones, director of public information at the National Safety Council. Mr. Jones pointed out to the safety-conscious producers that off-job safety is just as vital to a company as on-job safety—and mustered an impressive array of thought-provoking figures to prove his point. Meat for discussion was his challenge, "How can we explain our strange resignation to paying $12 billion every year that could be saved by an organized accident prevention program?"

Safety awards were made to those members of

Please turn to page 100

LEFT: 'Round and 'round we go as NCSA general counsel J. F. Lane explains the maze of federal regulations waiting to ensnare the unwary crushed stone producer

RIGHT: Dr. Nicholas Nyaradi tells NCSA members his impression of what it's like to discuss economics with the Soviets. Dr. Nyaradi, a former Minister of Finance in the Hungarian cabinet, is now at Bradley University in Peoria

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At a coal stripping operation in Pennsylvania, this TC-12 removes overburden at a rate of 400 to 500 yds. per hour. It is equipped with 16' blade...works two 8 hr. shifts a day.

Euclid Twin-Power teams — TC-12 Crawlers and TS-24 Scrapers — move over a million yds. a month at this Wyoming open pit uranium operation.

Model C-6 crawler back-filling overburden in the pit . . . full-power shift, good visibility and fast response make this "Euc" a high production machine for mine and quarry work.

Work-ability of "EUC" Crawlers Steps Up Production on Tough Stripping Jobs

Euclid's modern crawlers—the 211 net h.p. Model C-6 and the Twin-Power Model TC-12 with 425 total net h.p.—have set new standards of tractor production in mine and quarry work. With performance proved Torqmatic Drive, both of these crawlers have excellent maneuverability and fast response that cuts work cycle time. They're engineered for easy service accessibility that results in less downtime and lost production.

Have your dealer give you all the facts on these "Euc" tractors...he'll show you the features that pay off in better production on every stripping job, whether it's heavy dozing or ripping work, push loading big scrapers, or moving coal, ore and other materials.

EUCLID Division of General Motors
Cleveland 17, Ohio

Plants at Cleveland and Hudson, Ohio, and Lanarkshire, Scotland.

GM GENERAL MOTORS EUCLID

EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

continued from page 98

OPERATING SCALE MODELS of big shovels and trains drew the fascinated attention of crushed stone producers old and young to this exhibit at the NCSA show in Chicago

the association whose impressive safety records had earned coveted awards. Winner of the Explosives Engineer Award and top of the Group I list was the Clinton Point Quarry of New York Trap Rock Corp. with a spectacular record of 336,330 man-hrs. in 1958 without an accident.

Other winners whose achievements were just as commendable in their group were North Brantford No. 7 Quarry of New Haven Trap Rock Co., winner in Group II, Superior Stone Co.'s Woodleaf Quarry in Group III, and the same producer's Hickory Quarry Group IV winner. Group V winner was the White Haven Quarry of General Crushed Stone. These awards were presented by H. H. Kirwin, chairman of NCSA's Accident Prevention Committee.

Production problems, large and small were thoroughly aired. These ranged from Donald B. Wendling's description of his company's McCook Quarry expansion, to an outstanding Hint and Help developed by A. J. DeMarchi, superintendent of Canada Crushed and Cut Stone, Ltd. Facts and figures on drilling were presented by Julian Parton based on experience at General Crushed Stone Co. quarries. The session was rounded out by a symposium of materials handling specialists including R. C. Meissner of Meissner Engineers, Inc., R. T. Lassiter, Western-Knapp Engineering Co., and E. L. Heidenreich, Jr., a consulting engineer in the problems of rock products producers.

● Vulcan Material's new plant at McCook, Ill., replaced an old plant on the site, and it was a major engineering feat to make the changeover without interrupting production. Capacity was doubled to 1,000 tph. with no increase in the labor force, but it took an investment of more than $5 million, two years of construction and a maze of automatic controls to do it.

● It's a ticklish job at best to rework the lower concaves and mantle of a gyratory crusher—most producers prefer simply to replace these parts. But Canada Crushed and Cut Stone preferred to work out a method of rebuilding which would save the time and expense of dismantling the crusher. To do this, ¾ x 2-in. nickle-manganese bars were cut into sections between 13 and 13½ in. long and bent to match the arc of the worn concave.

Each bar was welded in place with a manganese rod, securing it along the top and bottom edges only. To eliminate distortion or creep, each weld was started in the middle of the bar. An additional fillet was placed along the top to make a smooth transition from the parent metal to the bar.

Mantles were built up in a similar way using segments of round bars. Each row of rounds is spaced just far enough apart to get a good bead of weld under the bar. The contour is restored by using ⅜, ¼ or ¾-in. 14 percent manganese rods.

● Julian Parton's paper should have completely dispelled any producer's doubts about the low efficiency of churn drills when stacked up against modern high-speed drills. We won't labor the carefully prepared detail which Mr. Parton marshalled to prove that rotary drills outperform churn drills by every test, penetration rate, cost per foot of hole or cost per ton of rock produced. At the White Haven Quarry a churn drill made a 9-in. diam. hole in quartzite at a penetration rate of 1.81 ft. per hr. at a cost of $7.57 per ft. and a cost of 10¢ a ton of rock. In contrast, a rotary making a 9-in. hole did so at a penetration rate of 8.2 ft. per hr. at a cost of $2.50 per ft. and 4.1¢ a ton of rock produced.

General Crushed Stone has a number of quarries and this method of analysis has been used in each one. In this way, the most efficient drilling technique can be selected for the problems of each kind of stone. The significance is clear—before a producer can select the most efficient drilling equipment for his quarry he must have facts and figures for his own operation before him.

Federal laws and regulations of interest to

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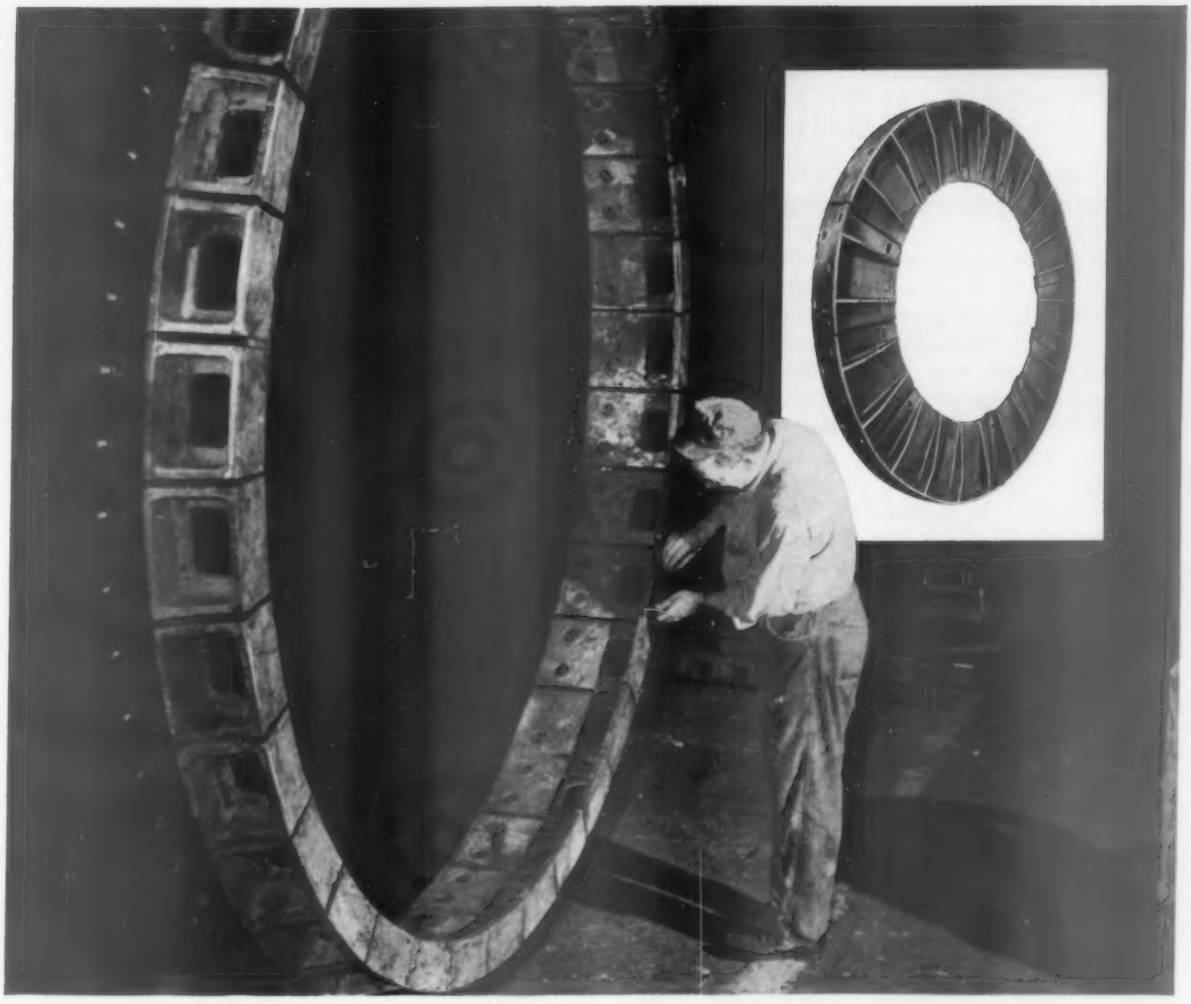

IN CEMENT, LIME, AND DOLOMITE PLANTS...

B&W Nose and Tail-Ring Castings Demonstrate Longer Continuous Service

Longer brick life and longer continuous service are being attained by 275 kilns in 54 plants using B&W Nose and Tail-Ring Castings. In many cases, the life of these castings has exceeded 9 years.

Light and strong B&W Alloy Castings have improved kiln performance in most installations. Made of heat-resisting Grade HH alloy, nose ring castings eliminate belling out of the kiln shell, assuring longer brick life and longer continuous operation of the kiln. By protecting the end of the kiln shell from direct flame, the nose ring castings prevent "feathering-down" of the shell because of oxidation. Their design eliminates cracking and warping, experienced with large size castings.

Small size and light weight make B&W Castings easy and inexpensive to install. The protecting flange on the nose ring castings permits the use of low-alloy steel bolts for fastening.

Spare part inventory may be kept low because the same nose ring castings may be used on kilns varying up to 4 feet in diameter, depending upon size. Write for Bulletin S-17. The Babcock & Wilcox Company, Boiler Division, Barberton, Ohio.

S-467

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BOILER DIVISION

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NATIONAL CRUSHED STONE ASSOCIATION MEETING REPORT

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crushed stone producers were aired at a special luncheon session for executives. So important was the 2½-hr. meeting that only a few of the topics scheduled for discussion could be covered in the allotted time. J. F. Lane, NCSA general counsel, discussed briefly legal problems facing producers. Producers' questions on various labor laws and regulations took top billing. Best advice Mr. Lane could give is to take advantage of legal talent to determine your specific position under the labor laws and regulations applying to your specific situation.

For a starter, he outlined the Fair Labor Standards Act, Walsh-Healy Act, Bacon-Davis Act and others. Each has application in somewhat different areas, depending upon the producer's position as a supplier or contractor, or whether he is doing business with the government. Although Mr. Lane exposed his wide knowledge in the application of labor laws, problems concerned in description of certain specific cases only pointed up how utterly confusing it may be to arrive at the proper solution without the benefit of good legal assistance.

ABOVE: Production efficiency was discussed almost everywhere in the exhibit area at the NCSA convention

Quarry blasting and its side effects in the community were topics of two outstanding papers, Dr. Leonard Obert, chief, Applied Physics Laboratory, U. S. Bureau of Mines, outlined the Bureau's investigation program into the problem. J. R. Kringel, vice president, production, of New York Trap Rock described this major producer's experiences along this line.

Seismic effects of quarry blasting will be available to the crushed stone industry in a few years in the form of a new bulletin. The old one, published by the Bureau of Mines in 1942, was based on data collected with instruments that are now considered primitive. In fact, the old Bulletin 442 will not serve to answer many of the inquiries now coming to the Bureau. For these reasons, the industry and the Bureau saw the need for revising published information, and entered into a joint 5-yr. program of study beginning in 1956. Four years will be spent on actual collection of data and one year in writing them up. Major objective of the program is to determine relationship of size of blast to damage done.

Information from many sources will be combined in the new report, to give the most up-to-date data available. The Bureau will study shot to measurement-point distance, millisecond delay blasting, types and depths of overburden and many other factors in determining the relationship of magnitude of vibration at the structure site and vibration of parts of the structure. Already, the Bureau has taken measurements at three quarries and several other locations. Dr. Obert stated that the success of the program under his direction will

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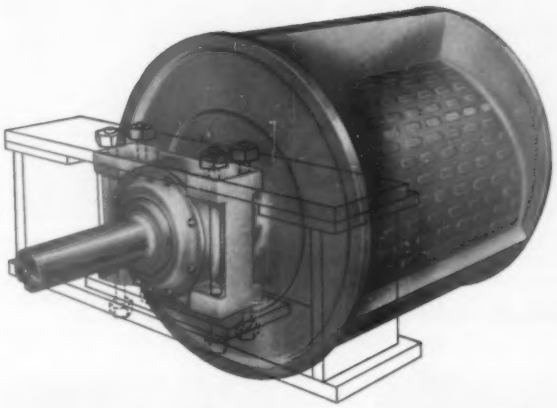
A GROUP OF EMINENT ENGINEERS discuss the problems of surge storage; from left to right: E. L. Heidenreich, Jr., R. T. Lassiter and R. C. Meissner

HIGH REDUCTION RATIOS with HIGH CAPACITY

KENNEDY DUAL-ROTOR IMPACT BREAKERS



This is the exclusive KENNEDY solid rotor of armor plate steel machined to perfect balance. Its entire face is hard surfaced. Manganese steel end discs prevent side wear and confine process material to the reduction area. A heat treated, alloy steel shaft is pressed and locked into the rotor core. Heavy duty, self-aligning, spherical roller bearings are rigidly attached to the heavy, box section base frame.

KENNEDY Impact Breakers are characterized by high capacities, high reduction ratios and a high proportion of cubical product at relatively modest initial and operating costs. Five convenient sizes are now available, from 30 x 48 to 60 x 72. These, plus the 36 x 30 single-rotor model, make up a line of machines with a size for every application.

KENNEDY Impact Breakers feature:

- primary and secondary reduction in one operation . . . because of their higher capacity, fewer machines are required.
- use of the principle of true, controlled, free impact . . . rock is shattered along the lines of natural cleavage.
- simple, inexpensive maintenance . . . truly effective use of wearing parts keeps output and product quality high.

Send for KENNEDY Bulletin 60-A describing the many features of KENNEDY's Dual-Rotor Impact Breakers, the most efficient and effective impact breakers built.

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Primary & Secondary Gyratory Crushers • Jaw Crushers • Roll Crushers • Impact Breakers • Hammer Mills • Rod & Ball Mills • Kilns & Kiln Accessories • Dryers • Scrubbers • Screens • Pneumatic & Mechanical Conveyors • Complete Crushing, Lime, Cement & Carbon Paste Plants. • Research & Testing Service.

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**Charged with creative energy*

To be dubbed "live wire" by customers is nice. But it also is a warning signal which alerts our organization to stay alive to the fact that a greater output of creative energy is necessary when you're in front running position.

In the Union research laboratory and in those of the steel producing organization in which Union is integrated, technicians are hard at work on many new projects. They were started and will be finalized in the field where Union engineers spend more time than in the laboratory.

Classic example of what results from such deep and constant probing is the Tuffy family of wire ropes and slings, each one of them engineered to a specific job. Among 1600 standard wire rope constructions, in day to day production, none could be classified as the ultimate low cost wire rope for bulldozers, draglines, scrapers or hoisting equipment. One by one new metallurgical specifications and rope and sling constructions were tailored to meet the different but tough operating conditions inherent in the jobs these machines perform.

Tens of thousands of applications have established the unchallenged supremacy of Tuffy special purpose wire ropes and slings.

Tuffy Wire Ropes and Slings are "Job Prescribed" for Tough Jobs

Tuffy Balanced Dragline Rope

Tuffy Balanced Scraper Rope

Tuffy Balanced Dozer Rope

At Mount Rushmore National Memorial in South Dakota small fissures in the sculptured faces of Washington, Jefferson, Lincoln and Roosevelt are being sealed with granite dust and white lead. Though the granite sculpture is estimated to last for thousands of years, this preventive maintenance will keep the surfaces smooth and slow the natural erosion process. The insert shows how workmen are suspended on Union Wire Rope.

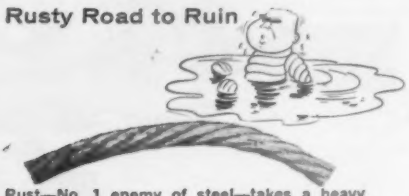
For "Live Wire" Service— Look Up Your Union Distributor in the Yellow Pages

When you get him on the wire, you're sure to get the best in wire rope and slings—plus service that helps you get from Union Wire Rope products all the quality and long life Union builds into them. Union Wire Rope Corporation, 2156 Manchester Avenue, Kansas City 26, Missouri.

Tuffy Wire Rope Tips

Guard Against These Killers!...Get the Full Measure of Service-Life Built In By Wire Rope Specialists.

Rusty Road to Ruin



Rust—No. 1 enemy of steel—takes a heavy toll in wire rope life. The one-strand break shown here resulted when the rope was allowed to become rust-bound through lack of lubrication. Tests show that properly lubricated rope has up to 10 times the life expectancy of dry rope.

Crushed by a Tractor Cleat

The Sunday punch for this piece of wire rope was delivered by a tractor cleat—just one of many crushing injuries caused by rope being run over or banged into by hard, sharp objects. Even the toughest wire rope is no match for this kind of mistreatment.

After a Suicide Jump

This rope jumped out of sheave and was soon destroyed by pulling around the shaft. Actually it was a case of sudden slack which threw the rope out of the sheave.

Burned on a Frozen Sheave

End of the line came quickly for this rope as the result of operating over a sheave that did not turn. Note the exceptionally heavy abrasion on one side of the rope. Sheaves should be checked thoroughly and often.

Would you like a copy of a booklet in which more than a score of Tuffy Tips like those above are reproduced. If so, write Union Wire Rope Corporation, 2156 Manchester Ave., Kansas City 26, Missouri.

Tuffy Balanced Slings and Hoist Lines

2-C

UNION Wire Rope

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OPENING A NEW ERA IN PERCUSSION DRILLING...

New PR123 GARDNER-DENVER Power Rotation Rock Drill

ABSOLUTE CONTROL

New Gardner-Denver PR123 gives your operator absolute and independent control of all these vital functions:

ROTATION WITHOUT IMPACT —efficient gear motor supplies rotation in either direction, even when drill is not impacting. Three rotational speeds.

IMPACT WITHOUT ROTATION —separate control provides drill impact without rotation. Percussion can be varied from light to heavy blows, and used to loosen couplings or stuck steel.

IMPACT AND ROTATION —use light percussion and rapid rotation for soft formations . . . or heavy impact and slow rotation for drilling hard rock.

UP TO 30% FASTER PENETRATION

New PR123 uses all hammer energy for percussion. There's no rotational drag on piston hammer. Results: faster hard-rock drilling than ever before. Depth of hole does not affect drilling speed.

SELECTIVE DRILLING

Now your driller can select the right combination of rotation speed, impact force, feed pressure and hole blowing for fastest penetration in any type of rock—can change drilling action as soon as the bit hits a new formation.

NO ROTATION PARTS IN CYLINDER

New PR123 has no rifle bar, ratchet ring, pawls, or other internal rotation parts that frequently cause trouble. Rotation is supplied by an efficient gear motor, and a torsion bar absorbs rotational shock between shank and motor.

POWER COUPLING AND UNCOUPLING

Independent power rotation is a time-saver. Rotation without impact permits power coupling of threaded rod without thread damage. Reverse rotation speeds uncoupling when coming out of the hole. Independent power rotation also helps free stuck steel.

Specifications: Piston diameter: 4½". Length: 38½". Weight, less mounting: 290 pounds.

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Ave., Toronto 16, Ontario

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DISCUSSIONS HERE were strictly business as producers showed interest in techniques for exploration and development

depend on the cooperation of quarry operators making available the test sites.

On quarry blasting effects, Mr. Kringel said, "We know we're not doing damage, but we can't convince people of it." He has studied more than 1,000 seismographic recordings which prove that there's no correlation between vibrations and complaints. For instance, his record in 1958 on 100 blasts produced 123 complaints. But in 1959, 130 blasts resulted in only 39 complaints.

The reason for this difference, according to Mr. Kringel, caused him to develop a different concept of the blasting complaint problem. He now has to assume that "we're not really dealing with technology, but with people—annoyed people who wish to punish us." Further, he noted, it is impossible for people not to confuse air blast with vibration. When they hear windows rattle, they think it is vibration, when actually it is an effect of air blast.

What they see and what they hear, if associated with other sense perceptions, is always taken for granted. But that doesn't mean that what they see, for instance, is fact. Mr. Kringel presented a National Science Foundation film titled "Visual Perception" to prove his point. It showed that distance combined with dimension may cause a person to see relationships in size that don't exist.

Study of the seismographic recordings proved to Mr. Kringel that there is no correlation of atmospheric conditions and blast complaints. That exploded theories that one should never blast when climatic conditions were overcast, rainy or foggy. He did find, though, that (1) a temperature inversion within 5,000 ft. of the surface, and (2) change of direction or velocity of wind within 1,000 ft. of the surface made quite a difference in blast effects. Based on the consideration of those two facts alone, his company reduced blast complaints 77 percent. He uses local weather service to determine these conditions.

If you want to succeed in business, you must become interested in politics. Why? Mr. W. H. Baumer, Johnson & Johnson, New Brunswick, N.J., said that your future growth depends upon a strong public policy and—not to be taken lightly —72¢ of each of your sales dollars go to pay for government.

There are several reasons businessmen don't want to get into politics. Some fear that it will hurt their own business or their own chances in their company. Others have a fear of possible conflicting attitudes among company officials. Some say they move around too much, that politics is a "dirty" job, or that they simply don't have an interest in politics.

Mr. Baumer thinks these are only excuses. Becoming active in government will be helpful to you and to your company. It will stimulate employment opportunities and will help in the important job of educating the public on the value of free enterprise. "The best place to get active in government and politics," he suggested, "is where lawmakers are made and not where laws are made."

Marketing problems from the users' point of view were aired by three speakers. J. P. Datesman, a process engineer for the Chicago & Northwestern Railway, brought producers up-to-date with an outline of the specifications of stone needed to stand up under modern ballasting practices. Fortunately for many producers, quartzite is not the only adequate crushed stone for this service. (See ROCK PRODUCTS, Nov. 1958, p. 79, for the Northwestern RR. story.) Once a railroad has done a major reballasting job it can save money by maintaining the track with "skin lift." This is a technique of raising the track only a small amount, say 1 to 1½ in., and ramming new ballast in place. This should represent a challenging market for rock producers who have durable rock to sell. In fact, since most railroads in this country are using an inferior ballast only because they own deposits,

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NATIONAL CRUSHED STONE ASSOCIATION MEETING REPORT

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they should be a prime object of producer education and sales effort.

A representative of the Bureau of Public Roads read Ellis L. Armstrong's comments on the vast market waiting for rock producers in the unfinished highway program. He estimated that 114,000 tons of all kinds of aggregates are used in every million dollars worth of construction. This is broken down into 65,000 tons of contractor-produced material and only 49,000 tons supplied by established producers. In addition, secondary highway construction calls for about 48,000 tons of aggregates for each million dollars' worth of construction.

Missouri is one of the states not blessed with an entirely adequate supply of first-class aggregates for highway construction. F. V. Reagel, an engineer for the Missouri State Highway Commission, outlined his state's dilemma and the procedures it is using to make the best of it.

The Board of Directors of NCSA elected new officers at its meeting on Sunday, Feb. 21, 1960, before the formal opening of the convention. G. D. Lott, Jr., Palmetto Quarries Co., Columbia, S.C., was elected to the presidency from the position of vice president that he held in 1959. New vice president is Charles Coburn, Waukesha Lime & Stone Co., Inc., Waukesha, Wis. The Board re-elected J. R. Callanan, Callanan Road Improvement Co., South Bethlehem, N.Y., as treasurer, and J. R. Boyd, NCSA executive director, as secretary.

Past president O. E. Benson was elected a member of the Executive Committee. Six elected directors include: W. P. Foss, New York Trap Rock Corp., West Nyack, N.Y.; D. C. Harper, Southwest Stone Co., Dallas, Tex.; J. L. Holden, Genesee Stone Products Corp., Batavia, N.Y.; M. E. McLean, East St. Louis Stone Co., East St. Louis, Ill.; W. D. Milne, Kentucky Stone Co., Louisville, Ky., and D. L. Williams, Virginian Limestone Corp., Ripplemead, Va.

New chairman of the Manufacturers Division is George D. Fraunfelder, Easton Car & Construction Co., Easton, Pa.; C. D. Smith, Joy Manufacturing Co., Pittsburgh, Pa., was elected vice chairman. Past chairman of the division, L. A. Eiben was elected to the Executive Committee. Newly elected directors of the division are: L. A. Rhodes, Stedman Foundry & Machine Company, Incorporated, Aurora, Ind., and C. S. Weber, Thew Shovel Company, Lorain, Ohio.

Next convention of NCSA will be held at the Americana Hotel, Bal Harbor, Fla., Jan. 17 through 20, 1961. The board also decided to return to Chicago for the next combined annual convention and show. It will be held in the Conrad Hilton Hotel during the week of Feb. 18, 1962. **END**

NEVER UNDERESTIMATE THE POWER of a woman. The young lady handing out free samples of one manufacturer's product drew large crowds of interested onlookers

LEFT: "This is to make sure you don't finish ahead of me," cracks J. Louis Powell just before launching into his pithy comments on *Cave Man to Space Man*

SYMONS® CONE CRUSHER AIDS WATER DIVERSION PROJECT

. . . produces over 100,000 tons of granite gravel with original crushing members

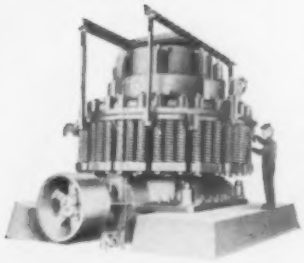
Shown "on location" in scenic Colorado, this 3-ft. Symons Standard Cone Crusher is doing an outstanding job of producing aggregate for a 23-mile long tunnel to divert some 500 million gpd of western slope water out of the Blue River to the eastern slope of the Continental Divide.

Operated by Blue River Constructors, in a crushing plant designed by Brown and Root, Inc. of Houston, this sturdy crusher has produced more than 100,000 tons of tough granite gravel, with the original crushing members.

This is another good example of the dependable performance that contractors and producers have learned to expect from Symons Cone Crushers, in both stationary and portable service.

Write for literature.

NORDBERG MFG. CO., Milwaukee 1, Wisconsin



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. . . The machines that revolutionized crushing practice . . . **are built in a wide range of sizes, for capacities to over 900 tons per hour. Write for descriptive literature.**

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Part 2*

VERTICAL LIME KILNS LEAP INTO MATURITY

by Victor J. Azbe†

AN OPPORTUNITY to put our new-found understanding to use by making some radical changes on a wood-fired Canadian kiln, Fig. 4, was offered. The grates were moved far down and the bridge wall raised to make a deep firebox for a thick fuel bed. This changed the furnaces into semi-gas producers. Rather than completely burning the fuel, it now was converted into a combustible gas. The principle here is that combustion should take place up among the lime and not some distance away. In many plants where underfed stokers were tried, they induced high heat in furnaces, yet performance was never much good.

The grates put in here were the shaking type. Worked frequently, there was a glow in the ash pits from a very thin ash bed. The high furnace had limited air access. With the hot bed and reduced size of the openings leading into the kiln, a gas pressure was created. This dispersed high-velocity, hot gas deep into the lime.

With gas entering the kiln under pressure, the lime draw gate could now be opened allowing air to pass up through the lime pit. Now it is a genuine lime cooler and recuperative air preheater. Thus, any gas resulting from the incomplete combustion of fuel generated in the furnaces (gasification chambers) was now burned with preheated air from cooler in calcining zone of the kiln.

There were other changes: The doors to the fireboxes were changed from the center of the furnaces (as in "A") to the side (as in "B") for more convenience. This made frequent charging of fuel possible, yielding a more steady evolution of gas.

A wall supported by an arch was built in the center of the shaft, and four poke-hole doors were installed. The wall deflects the upcoming air toward the incoming gas, and holds back the less well-burned lime in the kiln center. Trimming is done through the special four trimming doors in an entirely new, more logical and convenient position. But little trimming is necessary.

Results were remarkable. Lime production and fuel economy doubled. While there was as much labor, it was lighter by far; with lime production increased, labor was cut in half on the basis of production. Lime was drawn once an hour into wheelbarrows; since it was fully cooled and good lime, it could be taken directly to the railroad car. Combustion was complete, and there was little CO in the exhaust gases. This was due to lower temperature of the gasification chambers and to more even firing.

A truly great achievement, cheaply arrived at, the method is still good today for either coal or wood where high production is not necessary. A ton of lime was obtained for 6 million Btu. compared to the intermittent kiln's 12 million. Kiln labor was 1½ hr. per ton compared to over 5 hr. for the intermittent kiln, indicating that this is a really good substitute.

The kiln which Schmatolla evolved during the latter part of his career was equipped with two gas producers, as in Fig. 5. These were deep, and their height created a gas pressure through hydrostatic action. The kiln's deep lime cooler induced combustion air to burn the producer gas. There were no fans at the producer; nor was there, initially, an induced draft fan at the kiln top. The top was closed except for a limited and controllable outlet. There was pressure underneath, created by the hot column of kiln gases. No air could enter at this point. There were temperature differences within the kiln and, therefore, convection cur-

Please turn to page 116

*See also Part 1, *From primitive to modern in fifty years*, March, 1960, ROCK PRODUCTS, p. 122

†President, Azbe Corp., Clayton 5, Mo.

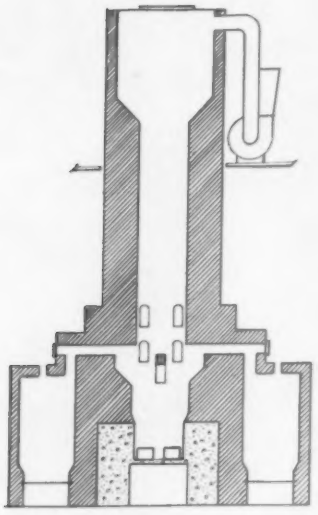

FIG. 5 (left)—This is a typical kiln designed by Schmatolla late in his career

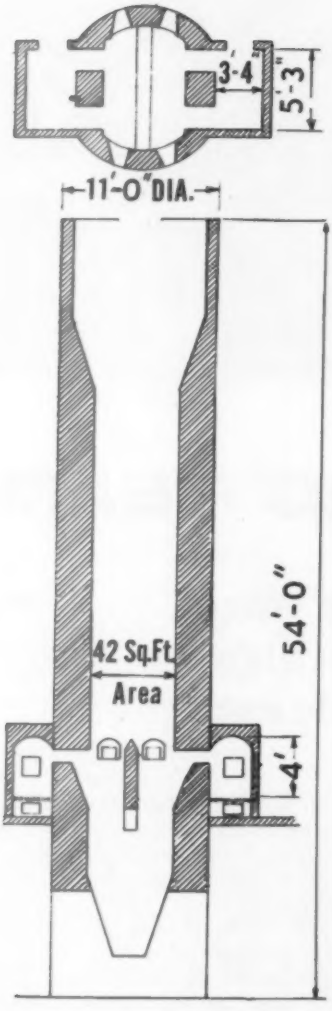

FIG. 4—A wood-fired Canadian kiln was revamped in this way to convert it to a semi-gas producer unit

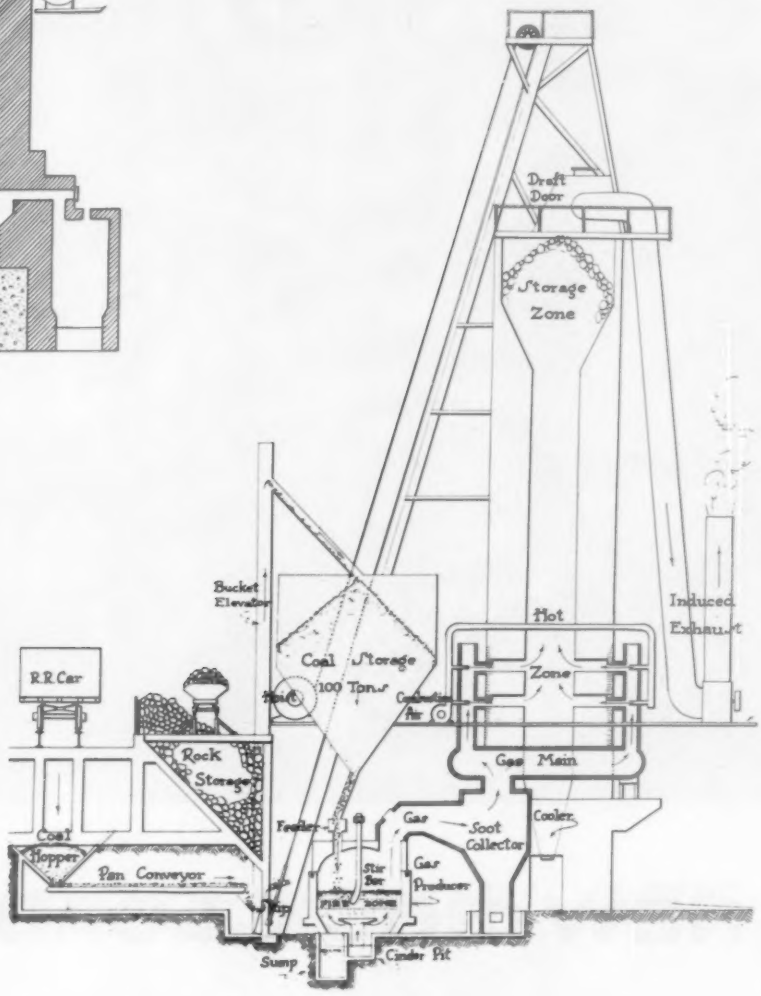

FIG. 6—One of the producer gas-fired kilns at Ste. Genevieve, Mo., which achieved record production, for 1925, of 80 tons of lime a day

TYPICAL STONE produced by hand-operated quarries is shown at the right in a car of "man-size" stone; at the left is a car of spalls to be calcined in a specially designed kiln

NEW ROCK LOADING TEAM

Hauler: 13-ton Michigan Tractor Wagon
Loader: 2¾ yd Michigan Tractor Shovel
Output: 2,400 tons daily on 2-mile cycle

Four years ago, the Fort Scott Hydraulic Cement Company, Fort Scott, Kansas began a program to replace their four crawler-loaders and two 10-ton tandem-axle dump trucks with the most modern equipment available.

The program was completed when a 13-ton rear-dump Michigan Tractor Wagon went on the job a year ago. Its addition gave Fort Scott, one of the nation's three major natural cement producers, an all Michigan fleet. The Wagon teams with a 2¾ yd Model 175A Michigan Tractor Shovel in the rock pit. Three other 2¾ yd Michigan Tractor Shovels handle the crushed rock, coal, and clinkers in this 4,500 barrel-a-day natural cement plant.

Tractor Wagon hauls 120 tons per hour

It's the heavy rock loading and hauling operation that Mr. Pat Thomas, president of the 92-year-old firm, points to as being the best example of how the Michigan machines have improved job efficiency.

Shot Florentine limestone is currently being loaded out of the far end of a pit 90 feet wide and 5,000 to 6,000 feet long. This makes the average haul cycle, between pit and crusher, about two miles.

The 162 hp Tractor Wagon's stability and speed of up to 31 mph is a prime production factor in the mile long *uphill* run from pit to crusher. With torque converter and full power shift, power and speed are instantly adjusted to match the load demand.

On two 10-hour shifts, the Tractor Wagon, sideboarded to meet rated ca-

Michigan 162 hp Tractor Wagon, with torque converter and power shift providing top speed, barrels uphill to plant.

With hydraulic rear dump, Michigan unloads fast. Quick-interchange feature, Wagon for 10½ yd Scraper, provides added versatility.

In spare time, 13 ton Tractor Wagon takes crushed stone from hopper to stockpile.

BOOSTS PRODUCTION 25%

pacity, and the highly-maneuverable 2¼ yd Tractor Shovel will load out an average 2,400 tons of rock . . . rock which weighs, when loose, approximately 2,500 lbs per cu yd.

2 Michigans outwork 3 units formerly used

Production in the rock pit has risen 25% since the Tractor Shovel replaced a crawler rig with similar bucket capacity, and the Tractor Wagon took over the job formerly handled by two 10-ton dump trucks.

When maximum production from the crusher is not a factor, the Tractor Wagon is taken off the shot rock haul and used by itself to build up the crushed rock stockpile, an operation previously handled by two to four random-sized dump trucks.

Compaction has reduced haul road maintenance

An added advantage, according to Mr. Thomas, is the Michigans' compacting action on the haul roads. The 31,500 lb (plus load) Model 110 Tractor Wagon and the 29,000 lb Tractor Shovels have reduced maintenance and actually improved haul road conditions as they travel between pit and plant.

Upkeep "phenomenally small," says president

"With all five of the Michigans working constantly with heavy loads and over sharp rock and abrasive cinders, *we have spent less than $2100 on overhauls, parts, tires and labor during the past three years,*" says Mr. Thomas. "I think this figure is extremely low considering what a machine goes through in a cement plant operation of this type. We have had virtually no downtime."

If you're hauling bulky materials off the highway, perhaps a Michigan Tractor Wagon could increase your production, too. When you pair it with one of the eight Michigan Tractor Shovel models (up to 6 cu yds), you've got a team that can't be beat. Let us demonmonstrate. Just call. There's no obligation, of course.

Michigan is a registered trademark of
CLARK EQUIPMENT COMPANY
Construction Machinery Division

CLARK EQUIPMENT

2481 Pipestone Road
Benton Harbor 13, Michigan
In Canada:
Canadian Clark, Ltd.
St. Thomas, Ontario

Hoped for: increased loading efficiency
Received: that PLUS 4 *other production jobs*

Result: Michigan replaces 6 machines

By purchasing a big Michigan Tractor Shovel, A. Cope & Sons Ltd, Hamilton, Ontario, naturally could expect *some* production increase over smaller units previously used in their quarry stockpile loading operation.

What they didn't expect was the dramatic increase they got—over 3 to 1. Nor did they expect the variety of other production jobs the Michigan could do *in addition* to its regular loading chores. And, these were jobs that *had been* considered strictly in the realm of crawler dozers and swing shovels.

Daily output: 4,500 tons

In the loading operation alone, the big Model 275A did so well it replaced all three loaders formerly used—a 2½ yd crawler, a 1½ yd swing shovel, and a 2¼ yd

Tractor Shovel. With its 22,000 lb lift capacity and 4½ yd bucket, the power-shift Michigan loads a 12 yd truck in 60 to 70 seconds. In a typical "peak period" 10 hour

day, its output totals up to 4,500 tons of crushed stone. Unit services even the smallest trucks—each one taking only one pass, 20 to 30 seconds, to load.

"One of the Michigan's biggest advantages," says George Eskine, Quarry Supt, "is that it can load from all our stockpiles with a minimum of lost time for travel. Crawler immobility was of course one of the principal reasons we previously had to use three loading units."

In non-peak periods, the mobile 28 mph Michigan

also does many jobs which formerly required at least stand-by assignment of other machines. For example . . .

Builds stockpiles

Stockpiles are located against the face of an old blast area. Trucks, from the crusher, dump at the top. The Michigan Tractor Shovel "dozes" material onto the stockpile, replacing in this job the regular services of a medium-sized crawler-dozer.

Strips overburden

Formerly, a couple times a year, one or two 10-yd scrapers and operators were hired to strip the clayey

topsoil overburden. Now, the Michigan, equipped with bucket teeth, strips and loads this material into company-owned haul units.

Cleans up, loads rock

The Model 275A regularly cleans up after blast and around the 2½ yd swing shovel. This task, too, was formerly handled by a crawler-dozer. Occasionally, also, the 4½ yd Michigan takes over for the rock shovel. Here, Michigan capacity and maneuverability actually speed the operation. In three quick passes, the Michigan loads an 18-ton rock-hauler.

Mobility and two-way radio key to multi-job production

Right from the start, the Michigan's capacity to do more than just load trucks was evident. Supt Eskine reasoned that with a two-way radio, assignment of tasks would be handled with maximum efficiency. Now, in a matter of seconds, the Michigan can be on its way from stockpile loading to shot rock loading or any one of the five other jobs it normally handles.

The Model 275A, as well as three 17,000 lb lift capacity Model 175A's which the firm operates in other divisions, has helped A. Cope & Sons increase production while cutting overall machinery investment. Perhaps a Michigan Tractor Shovel could do the same for you. Call us for a no-obligation demonstration.

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CLARK EQUIPMENT

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2481 Pipestone Road
Benton Harbor 31, Michigan
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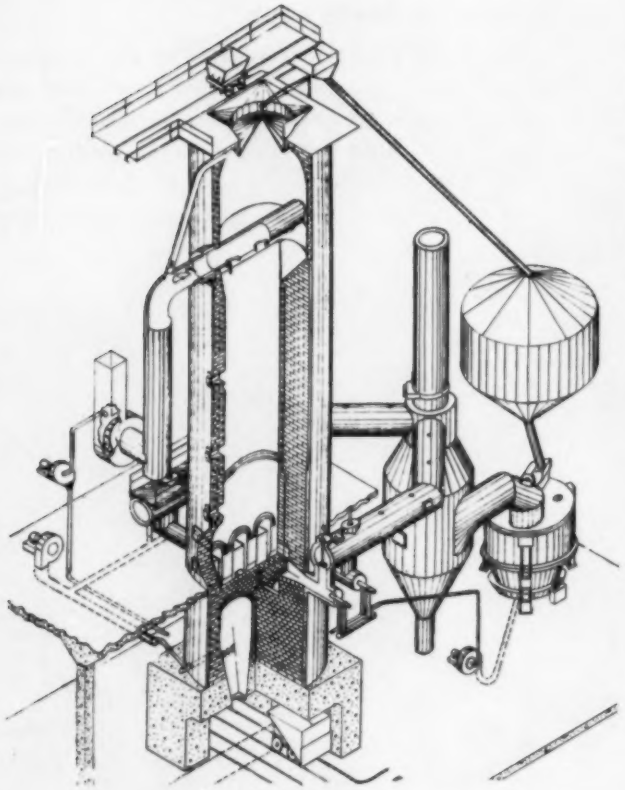


FIG. 7 (left)—Ivanhoe lime plant of National Carbide Co. had three kilns of this design with a producer gas recirculation arrangement

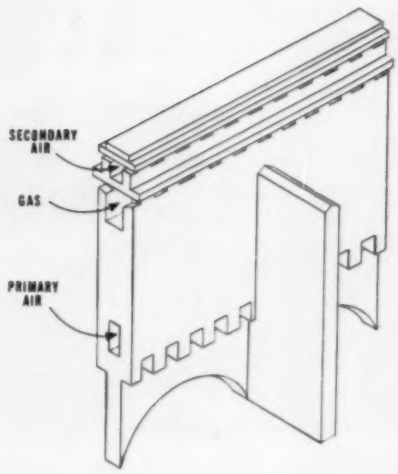
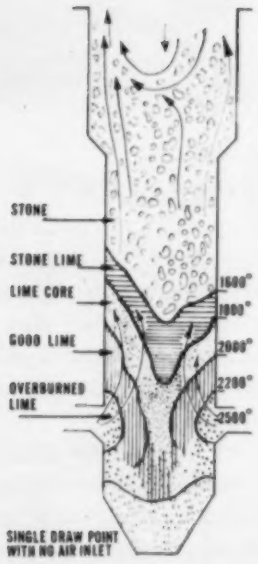
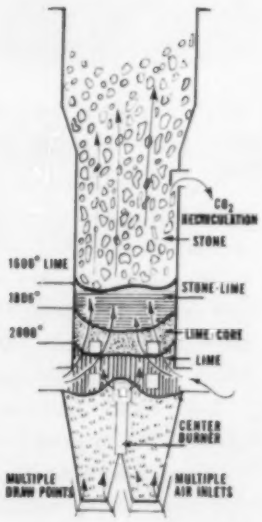
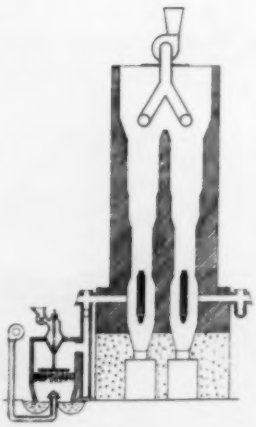


FIG. 8 (above)—The Azbe center burner, of patented design, greatly improves gas distribution of the calcining zone







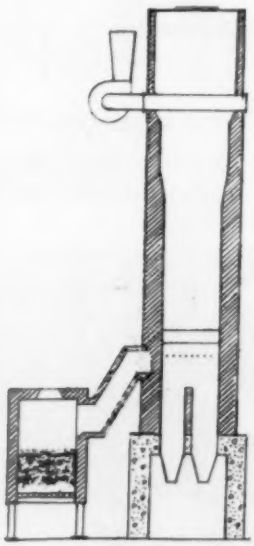


FIG. 9A (left)—This natural draft, low-capacity kiln had poor fuel introduction and hot column stratified gas flow which let "cold" stone slip past the hot zone. No lime cooler limited the lime draw arrangement, so the inaccessible hot zone yielded both high core and overburned lime. No temperature control was possible, and it was not economical in fuel, labor or refractory

FIG. 9B (second from left)—This design is suitable for high draft and high capacity operation. It has center and side shaft fuel introduction, equalized gas and material flow. A recuperative lime cooler permits selective lime drawing with full accessibility for inspection and trimming. Hot zone gas recirculation for temperature and fuel distribution control is possible. It is economical in fuel, labor and refractory

FIG. 10A (second from right)—When this kiln at York, Pa., was built in 1912, it was probably the world's largest, producing about 60 tons of lime a day. After redesign work in 1940, yield was doubled

FIG. 10B (right)—A small kiln was designed in 1952 for efficient production of 65 tons of lime a day

continued from page 111

rents, but these were hot gases of low temperature differential. Heating of the stone throughout the kiln cross section was much more uniform than it was in open kilns. The average temperature through the kiln was high and the draft good because excess air was kept out of the kiln.

The gas producers and the lime kiln cooler would push while the calcining and preheating zone would pull for a balanced draft effect in the hot zone. This operation resulted in 22 tons of lime per day from a small unmechanized kiln—a very good performance indeed.

The gas producer operated by natural air draft. There was no regular supply of steam; the ash pit was kept filled with water that was of little help. Illinois coal was used and all ash turned to clinker. Just before cleaning the grates, the clinkers were chilled, hardened with steam, then broken up and hooked out.

The gas was like no other producer gas of my knowledge. There was over 30 percent carbon monoxide, 1 to 2 percent carbon dioxide, hydrocarbons relatively undissociated and no steam to dilute the calorific content of the coal. Admixed and burned with the very hot air from the lime cooler, the deep yellow gas would give a flame that was dazzlingly luminous, 3,000 deg. F. or more. But the lining needed repairs every several months.

In the early twenties, we were given kilns to study and improve, and we made good use of the opportunities. The best available brick was tried, even 80 percent alumina "Coralite" and carborundum for arches and at special locations. We did not know that when temperature of combustion is very high, exothermic reactions may be induced between the acid refractory and the lime. This condition generated additional heat which would raise the temperature at the brick-lime interface to a degree no brick could withstand.

We found out what exothermic reactions can do when we tried fused "Corhart," a very good dense refractory. A certain critical temperature was reached after several days of quite satisfactory operation; then the exothermic reaction set in. Within one hour, all of the new lining disappeared like lava from a volcano, flowing down into the cooler and out of the draw gates into a wheelbarrow beneath.

But this was all part of learning and progress. Poke-hole doors were located and a center pier built in; this allowed the kiln to be trimmed, and the over-hot lime from the kiln walls worked ahead into the cooler. Next, an induced draft fan was applied, and steam added to the air in the producer ash pit. It all resulted in a kiln of about

TABLE I

Kiln	Stone size	No.	
A	4 x 8 in.	1	large
B	3 x 6 in.	2	large
B or C	2 x 4 in.	3	medium
C	1½ x 3 in.	4	medium
D	1 x 2 in.	5	small
D	¾ x 1½ in.	6	small

45 tons production a day, quite satisfactory for that time.

Two large producer gas-fired kilns were designed in 1925. Both were connected to one automatic gas producer and installed by Hunkins at Ste. Genevieve, Fig. 6. They produced about 80 tons of lime, a record amount for the time—the first kilns to give in excess of a ton of lime per square foot of shaft area.

These kilns (as well as Warner's and Palmer's) were unduly high. But we must remember that quarries were not mechanized; stone was broken with a sledge hammer and "man-sized" stone was calcined. If kiln capacity was to be high, kilns had to be tall to give stone ample kiln time. The photo shows one car of stone charged to these kilns, while the other car at the left has spalls which we were then attempting to calcine.

We learned rapidly. We had clinker and soot troubles, problems of distribution of gas between kilns, as well as distribution within the kiln. We realized finally that the reason the kilns did not perform better was a fault of both gas producer and kiln, but mostly of the gas producer.

First, we eliminated steam and substituted carbon dioxide as the endothermic agent in the producer blast. The first installation was at the Marblehead Lime Co. where it proved an immediate success and did away with the troublesome steam boiler.

Fig. 7 shows the gas producer and one of the three kilns we designed in 1929 for National Carbide Co.'s plant at Ivanhoe, Va. Gas was taken from kiln exhaust in the gas producer blast, and the kilns had center piers to hold up the weak kiln middle section and allow proper trim. Initially, only about 6 percent CO_2 in the blast was recirculated—just enough to avoid heavy clinkers, but enough to let high temperatures granulate the ashes. The ash bed had to be thick to prevent the fire from coming down accidentally onto the

Please turn to page 120

A MAJOR ENGINEERING BREAK-THROUGH IN EXCAVATOR DESIGN

You get up to 25% more output with "integrated" controls, the "VICON" system of power application and control, and the new "interlock" drum arrangement

The Manitowoc 4500 Vicon is a 6 yard shovel or 7 yard dragline, incorporating an entirely new concept of excavator design and performance. Over 3 years of on-the-job-experience has proved its soundness of design, greater ease of operation; much faster operating cycles; greatly reduced maintenance costs; and far greater output from both shovels and draglines.

"Integrated" Controls Simplify Operation, Clutch Slippage Eliminated

Operating the Vicon is like flying . . . Cycle phases are that smooth, that "integrated"! Even green hands get results because it takes 50% less operator movement to run the machine.

Conventional engine throttles have been eliminated. Each clutch control lever in the high visibility Vicon pilot house is *also* a throttle! Engaging a swing or drum clutch, for instance, involves simply pushing (or pulling) the clutch control lever from dead center (stop) position. The further the lever is moved in the natural direction of the machine's movement the faster and harder it works in that direction.

There is no slippage when clutches are engaged because the first 10° of control lever movement does not activate the throttle—therefore, clutch engagement is effected at low engine R.P.M. and almost zero clutch and drum R.P.M. By *continuing* to move the clutch control lever, which is also the throttle, the machinery is accelerated via fast, smooth, three stage torque converter against the load . . . without *any* clutch slippage.

No Brakes Needed To Stop The Swinging Action

In conventional excavators it is normal to apply considerable "braking" effort to halt the "swing" of the machine so that it can be started in the opposite direction. *Before* "Vicon" it was necessary for the opposite clutch or swing brake to take this thrust (the disadvantages of excessive friction heat and wear are obvious). With Vicon the machine stops swinging one way and very smoothly accelerates in the opposite direction because the torque converter acts like a brake, absorbs directional thrust, eliminates shock and slip on the swing frictions and then provides instant acceleration for the return swing.

Engine Application Has Great Versatility

"Vicon" is two engine power applied in a way never before used for power shovels and draglines . . . and with boundless advantages in performance, maintenance characteristics, and production! One engine provides the power for swing and travel while the other powers the drums . . . allowing you to perform several functions simultaneously, in a smooth blending of cycle phases that provide operating speeds beyond the capabilities of conventional excavators.

Vicon design gives you faster, smoother clutch engagement with drastic improvements on the conventional problem of wear, heat and fade . . . yet you maintain top working speeds.

With the Vicon power application, certain operating advantages are immediately obvious . . . For instance, one engine may be slowed down to accommodate an extremely tough phase of the cycle without jeopardizing the ability of the other engine to immediately take over the following phase of the working cycle. Or, one engine may complete its assignment at a relatively high speed while the power of the other is introduced at idling R.P.M. to take over the next phase of the work. Valuable production time is not lost because of engine "lug down". On the other hand, clutches are not jammed into engagement at high and harmful engine speeds . . . The result, a smoother, faster, more economical operation with greater output, longer machine life, better all-around performance.

"Interlock" Reduces Brake Use By 50%

Vicon operation is so smooth that the machine seems to loaf on the job. Yardage totals, however, tell the true story. For instance, on the Vicon dragline you get the new "interlock" drum arrangement which suspends the dragline bucket in the middle of an endless line . . . cuts brake use up to 50% and you take advantage of full horsepower on the hoist (instead of burning it up on the brakes).

Vicon Has Doubled Drum Brake Capacity

You get higher speed dragline cycles than were ever before possible—and designed into this new Vicon component is another innovation included specifically to give pin-point control and increase production.

Both outside flanges of both the front and rear drums of the Vicon serve as big, fast acting efficient braking surfaces. The advantages are readily apparent on various stripping locations where the operators take pride in maintaining such pin-point casting control that they actually trim and maintain vertical side walls. It is common, for instance, to see a Vicon operator taking advantage of Vicon "Interlock" making high

speed casts with the bucket held in a vertical position (teeth down). The bucket rushes out at full speed, is stopped smoothly over the top of the cut and then allowed to drop vertically to trim the wall. Vicon dragline drum "interlock" and drum brakes are in a class by themselves. Production gains are assured!

Other Innovations Are Yours With Vicon

For instance, a big universal radiator system gives you double the cooling capacity. Advantages of the Vicon cooling system are never more obvious than in prolonged travel with the Vicon maneuvering easily from one job location to the other. Travel, a situation embodying the most serious over-heating possibilities for the conventional machine, is no problem for the Vicon . . . which simply utilizes two engine cooling capacity for the operation of a single power system.

Shovel Has Less Weight—More Power On "Business End"

The Vicon shovel has all the advantages of the big, tough Model 4500 tubular style dipper stick and having separate hoist lines rigged from either side of the shovel bail to the other end of a reduction drive mounted on the base of the shovel boom—eliminating the weight and instability of a bail sheave at the bucket, plus bad fleet angles on the hoist cables.

There are many, many more design and operating features adding up to more output—reduced maintenance costs and lower cost yardage. Before you buy any machine in this class, it will pay you to get the complete story on the sensational 4500 Vicon.

Manitowoc

MANITOWOC ENGINEERING CORP.

(A Subsidiary of The Manitowoc Company, Inc.)

Manitowoc, Wisconsin

SHOVELS	CRANES	DRAGLINES	TRENCH HOES
1¼ — 6 YDS.	25 — 125 TONS	1¼ — 7 YDS.	1¼ — 3 YDS.

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VERTICAL LIME KILNS LEAP INTO MATURITY

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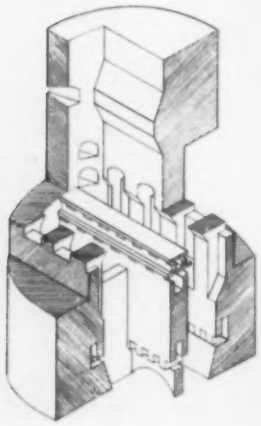


FIG. 11—A typical section shows how the center burner system was installed in an old kiln

blast hood and damaging it. Yet if ash in a thick bed is too fine, excessively high blast pressure is required. Lime dust in the recirculating gases would tend to block the flow through a thick bed of ashes of the automatic gas producer.

The present-day Azbe gas producer does not have the protruding blast hood, just simple, air-operated flat grates. Ash beds are very thin, ashes very fine, and lime dust does not interfere. A very large amount of kiln gas is recirculated; the blast often contains 20 percent CO_2 and about 8 percent O_2, at about 800 deg. F. It is this high temperature that permits the high CO_2 concentration. Such operation helps the gas producer and helps the kiln.

Imperfection of the gas producer, and poor gas distribution in the kiln, prevented the large kilns from producing more lime than they did. The Azbe center burner, Fig. 8, was developed to overcome this condition. It has had an astonishing and far-reaching effect, virtually revolutionizing lime burning as it finds ever-increasing use the world over. Whether the fuel used is initially gaseous, solid or liquid, its purpose is to improve gas distribution in the calcining zone. But it had other effects: large kilns could again be built, high drafts could be used and exceptional capacities achieved.

Fig. 9A compares the isotherms of an early kiln with those of a center burner kiln, Fig. 9B. After the invention of the center burner, the Palmer kilns, Fig. 10A, then the world's largest, were acquired by the National Gypsum Co. These kilns were restudied in 1939 and improved. The gas producer blast hood openings were enlarged and CO_2 substituted for steam. A larger exhaust fan, new exhaust connections and center burners were installed, one in each of the two shafts. Production was doubled to well in excess of 100 tons. They remained on the line operating at this rate for another 15 years, making up in part for the first 20. Further modifications and gas producer improvements could have increased output even more. We seldom run out of possibilities for improvement, but the producers ran out of stone first and the kilns were shut down in 1954.

In contrast, what is possible is shown in the kiln pictured as Fig. 10B. This is one of a series of four kilns that have a 10-ft. shell, and when hand-fired gave only 8 tons of lime per day. With a gas producer of the flat grate type, center burner and exhaust fan, the production was brought up to 70 tons of lime per day—almost 2 tons of lime per sq. ft. shaft area per day with 6-in. stone and normal draft of about 5 or 6 in.

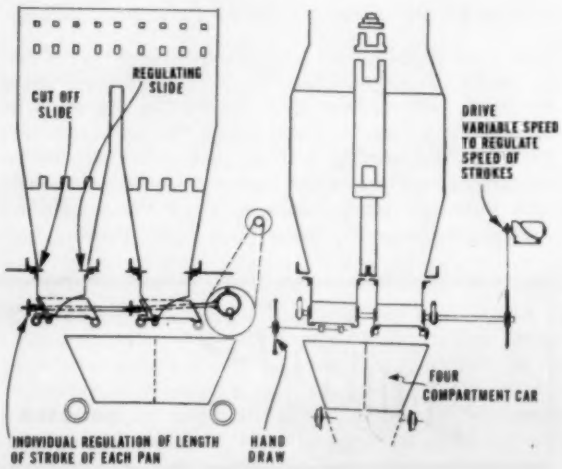
There is little ash in this gas producer compared to Palmer kiln producer, and the fuel bed can be thicker. With relatively low blast, large volumes of producer gas can readily be evolved. Properly distributed by the center burner and a fan system arranged for ample air supply, far better capacity is realized than the initial production of the Palmer kilns which were 8 times the size.

All new kilns at this time had center burners and they were put in most of the over-large old kilns designed by Schmatolla and other pioneers. Center burners were installed in these old kilns as shown in Fig. 11.

With the center burner proven, there were all kinds of new opportunities including lime drawing.

Please turn to page 122

FIG. 12—The center burner kiln can be built with sectioned cooler and mechanical draw system


REGULATING SLIDE
CUT OFF SLIDE
DRIVE VARIABLE SPEED TO REGULATE SPEED OF STROKES
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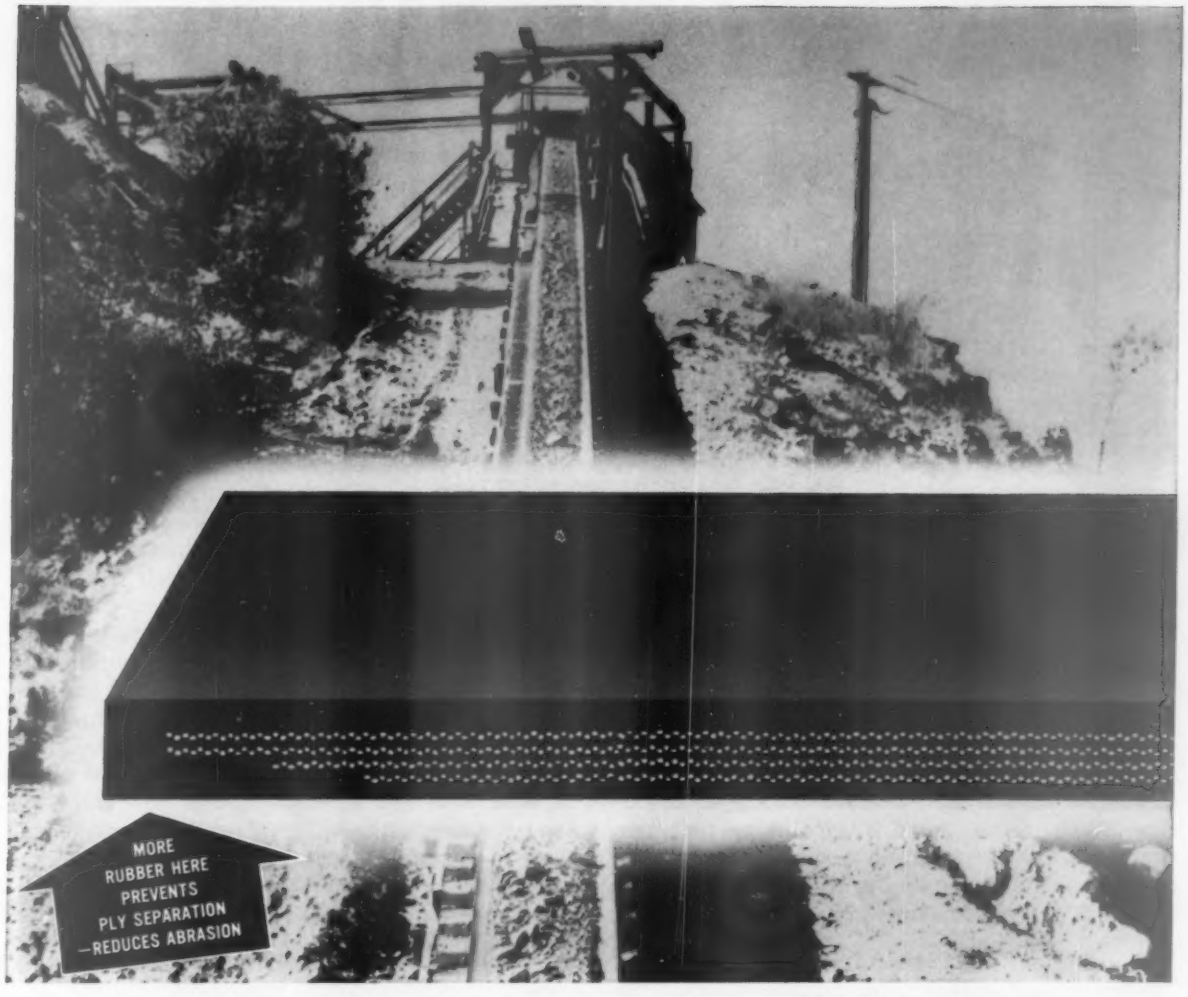
INDIVIDUAL REGULATION OF LENGTH OF STROKE OF EACH PAN
HAND DRAW



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Tests show Thermoid-Quaker "Coledge" construction lasts and lasts on the same jobs where other belting fails. "Coledge" construction is available on all grades of Thermoid-Quaker belting.

What's more, all Thermoid-Quaker conveyor belting is prestressed in manufacture, so that the belt is actually in compression when you get it—ready for the heaviest load without strain.

Examine Thermoid-Quaker Belting with the exclusive "Coledge" construction at your Thermoid distributor's, or write for further information to Thermoid Division, H. K. Porter Company, Inc., Tacony & Comly Streets, Philadelphia 24, Pa.

*Patent Applied For

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VERTICAL LIME KILNS LEAP INTO MATURITY

continued from page 120

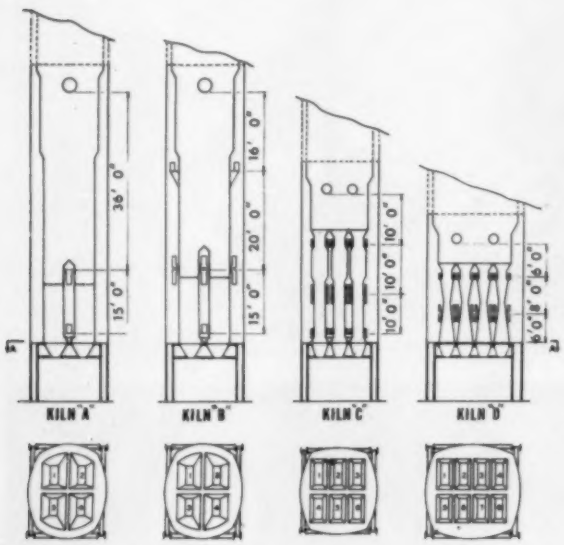

FIG. 13—A multiple center-burner system can be adapted to burn different sizes of stone in this way

A patent was obtained in 1942 on a mechanical lime drawing system used in combination with the center burner, Fig. 12. In 1946, a patent was granted on a multi-center burner system or, as the patent attorney chose to word it, "a plurality of firing walls," Fig. 13.

In theory at least, kilns for stone of half size should be only a quarter the height. The kilns of Fig. 13 and stone in Table 1 do not follow this proportion, but the active zone is increasingly lower. Gas penetration with small stone is increasingly more difficult to attain as the stone gets smaller. Firing inlets must be closer with a kiln of large shaft diameter and their number must be greater.

The simple center burner kiln, "A," with no side burners is quite satisfactory for large, nonspalling, closely sized stone. With smaller stone, more firing inlets are provided to assure crosswise distribution of heat.

Small stone has more surface area per cu. ft. of kiln volume, and individual pieces require less calcining depth. Therefore it can be calcined in a much greater weight per unit of kiln shaft volume —that is, provided enough fuel and air is introduced and distributed properly.

One kiln at Davenport had five center burners and with 1 x 2-in. stone produced 357 lb. of lime per cu. ft. of thermally active kiln volume per day. To our knowledge this is the highest production rate on the basis of active kiln volume ever attained. Compare this with the old type hand-fired kiln which would produce 10 lb. of lime per cu. ft.

Three kilns of twin center burner type were erected at Ashtabula, Ohio. Natural gas was not available so producer gas was used as fuel and there were two gas producers. Fig. 14 shows the original design. The kilns had a shaft area of somewhat more than 100 sq. ft. and were arbitrarily rated at 100 tons.

As there almost always is with any mechanical gas producer installation in any lime plant, there was trouble. The long gas flues sooted and tarred and had to be cleaned periodically. The ash would clinker and break up to float around before it could be found and removed. But even worse was the fact that the largest and best mechanical gas producer with a rated gasification capacity of 75 tons often gasified only 50 tons of coal per day. But that was all we had. Producer gas flame is luminous and mild, and very good lime is made. But the gas producer is limited in its capacity and has been supplanted by pulverized coal systems.

When natural gas became available at Ashtabula it was substituted for producer gas. The available amount of a steady fuel was now unlimited and the "plurality of firing walls" arrangement was advantageous for burning large quantities of gas. Fans were installed and, by a combination of high fuel, high air, high draft, high flow and high surface of the medium size stone, extremely high production was obtained.

But all this would not have been possible without the plurality of firing walls and other kiln features, a result of a lifetime of effort as here outlined.

The culmination of years of experience: From 10 tons of lime per day from an old-time kiln to 450 tons is progress indeed! From a relative heat transfer rate of 1.3 to 23.0 Btu. per sq. ft. of thermally active stone surface per degree temperature difference per hour is an enormous advance. It was made possible by the increase of gas flow from 10 cu. ft. standard of an old type to 186 cu. ft. per min. per sq. ft. of shaft area. This achievement at Ashtabula is a great credit to Union Carbide.

A ton of lime per day calls for about 45 cfm. of exhaust gases undiluted with excess and tramp air under standard conditions. At 600 deg. F. this would double, and 450 tons would make a volume of over 40,000 cfm. Actually this would be greater as there must be some excess and tramp air. No wonder a 500-hp. motor is required to draw and discharge this volume at 28-in. total pressure.

Please turn to page 124

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VERTICAL LIME KILNS LEAP INTO MATURITY

continued from page 122

This would be impossible if the kilns had not originally been designed for a superimposed storage zone. The kiln stone is charged at the same rate the lime is drawn, and exhaust temperature remains relatively constant, helping greatly to maintain a high output.

With 3½ x 5½-in. stone, Ashtabula's kilns have a heat absorbing surface per cu. ft. of kiln volume that is only about one-third that of Davenport. Thus, their calcining and preheating zone needs to be about 25 ft.; Davenport's was only 10 ft. Ashtabula attains its high capacity through a high rate of gas flow and heat transfer, while Davenport's capacity was due to the high surface in a cu. ft. of volume. Ashtabula achieves it through the very high draft of 28 in. Davenport got it through the very high surface area, with a more normal 6-in. draft.

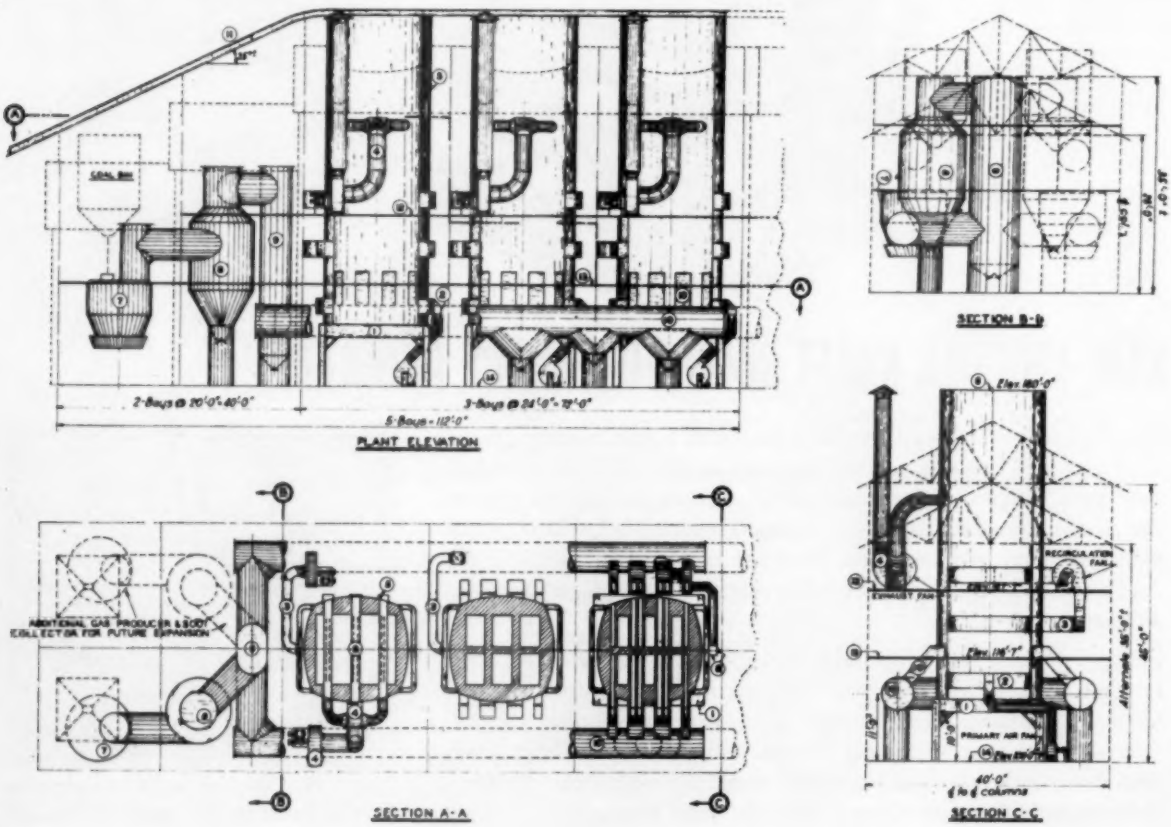
Of course, production must be governed by the size and quality of stone available and the quality required by what the lime is used for. Surface heat transfer rate is related to quality of the lime. Very high surface heat transfer results in what at MIT they call "shock calcination"—a case hardening which affects the properties of lime. This lime may be entirely satisfactory for carbide or steel; otherwise, it would probably be better to operate Ashtabula's at half capacity and only a quarter of the present draft.

We are emphasizing the Ashtabula and Davenport results because these are the points over which we will battle in the future and the lines along which we will progress. We think the small stone of large surface area will win out. It should give the most and the best lime requiring the lowest calcining effort, the least time and the lowest temperature.

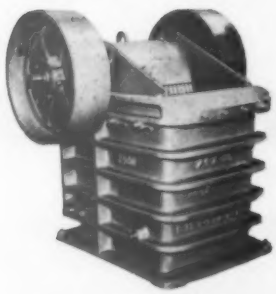
END

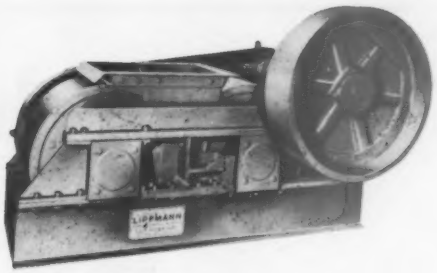
Editor's Note: The third and concluding part of Mr. Azbe's paper will appear in a succeeding issue of ROCK PRODUCTS. *He will discuss how the gas-producer kiln has been adapted for use in other countries.*

FIG. 14—The original layout of three twin center-burner kilns at Ashtabula, Ohio, used producer gas and recirculation. These have been reworked to use natural gas or electric furnace gas

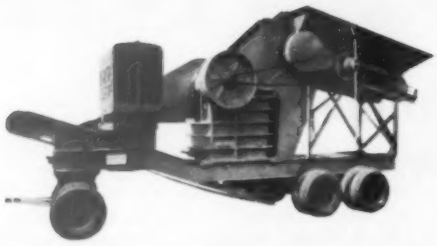


This year, U. S. producers will install a record-breaking





470 jaw crushers...800 gyratory crushers...150 roll crushers...



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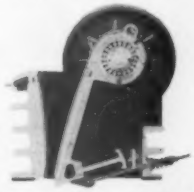
Exclusive "wrap drive" on Lippmann portable conveyors places *entire* drive mechanism at conveyor's *low-end*. Resulting weight concentration lets you use 25 to 33% shorter wheelbase without loss of stability... in turn doubles volume you can stockpile without re-positioning.



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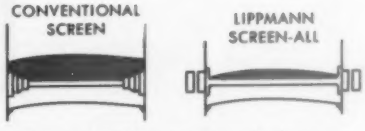

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Advance Progress Report

CF&I-Wickwire develops DOUBLE

New wire drawing technique gives you longer-lasting wire rope

CF&I-Wickwire's premium wire rope – Double Gray – has now been improved by a remarkable new wire drawing technique. This new wire rope – Double Gray-X – provides EXTRA LONG LIFE.

Wickwire's advanced wire drawing process is the joint effort of our research engineers, metallurgists and key production people. They sought to reduce the friction between the wires within the rope itself, thus producing a wire rope with greater resistance to bending fatigue. An important step in Wickwire's new wire drawing process is the use of *molybdenum disulphide.*

"Moly Disulphide" builds a thin, permanent molecular shield around each wire. Coupled with Wickwire's other advanced wire processing techniques, it gives these results:

- *Friction-free interaction of the individual wires in every strand of Double Gray-X* – A molecular jacket of Moly Disulphide on each wire helps cushion them against the effects of bending, crushing and abrasion. As the rope operates over sheaves, for example, the molecular shield tends to prevent the wire surfaces from grinding against each other, reducing friction and wear.

a superior wire rope

GRAY-X

- *Smoother surface to the wires*—In any wire, tiny imperfections occasionally form on the surface. These "weak links" can cause premature breaking of the wires and impair the life of the rope. Moly Disulphide helps eliminate any minute nicks, creating smoother-surfaced wires.
- *Higher degree of toughness which is essential to longer wire rope life*—Moly Disulphide greatly minimizes the friction involved in the drawing operation, thus preventing the wires from "heating up". This assures the correct physical properties for every wire in Double Gray-X and helps the wire retain its original toughness.

Double Gray-X will be made in a wide range of sizes and constructions to give greater operating economy and reduced downtime for all types of rope-using equipment. It will be available soon from CF&I-Wickwire's chain of warehouses and through a network of nationwide distributors.

EXTRA STRENGTH

In addition to longer life, Double Gray-X gives you the extra strength of Double Gray Wire Rope. Made of extra improved plow steel with an Independent Wire Rope Core, this rope gives 15% higher breaking strength than the catalog breaking strength of an improved plow steel rope with IWRC.

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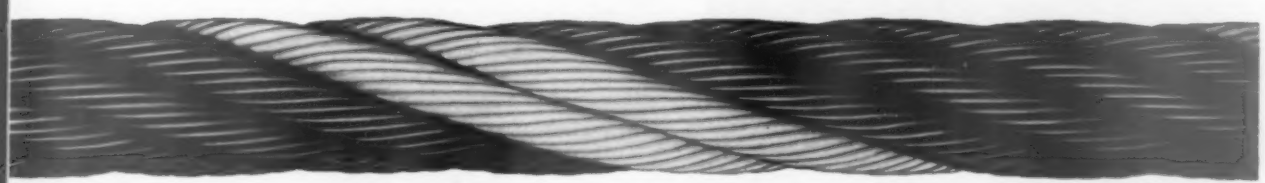

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OVERFLOW CROWDS in the Grand Ballroom listened carefully to speakers before the NSGA

OUTSTANDING SAFETY RECORDS were recognized as 19 companies received citations for 5 years or more without an accident

ROCK PRODUCTS' AWARD WINNER in Class C was the Stewart Sand & Material Co.'s Kaw No. 2 plant. George W. Garrett (left) and George E. Walton accept the trophy

Internal Revenue's point of view aired at NSGA's 44th annual convention in Chicago

Depletion wends its rocky road

YOU'RE NOT UP-TO-DATE on industry problems and what is being done to solve them, if you missed the 44th Annual Convention of the National Sand and Gravel Association. It was held in Chicago, Feb. 15 to 19, 1960, in conjunction with the National Ready Mixed Concrete Association and the biennial equipment show.

At least a dozen general topics of vital and immediate concern to producers in both industries were analyzed. Expert opinions on present status of and expected changes in crucial problem areas were presented. Those who attended learned that, contrary to popular opinion, the biggest cost in the sand and gravel industry is transportation, not labor. They heard that land reclamation programs pay off in dollars and cents.

Latest information was given on the federal highway program; its present status and possible future were discussed in relation to the past and expected difficulties in financing. Do you know how the Internal Revenue Service operates? Dana Latham, commissioner, was on hand to give the answer.

Problems of management, pit and plant operations, costs and national labor legislation affecting sand and gravel producers got a good airing. One session heard how confusing it can be to operate under current labor law and regulations. Major laws include the Griffin-Landrum Bill, the Federal Wage and Hour Law, the Davis-Bacon Act and the Walsh-Healy Act. Consensus is, after studying

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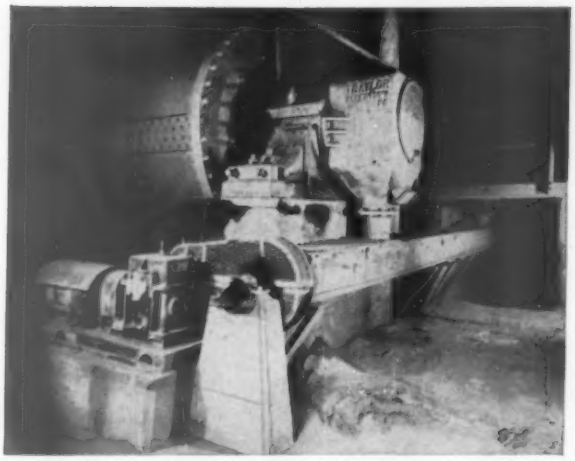
The Arithmetic of Materials Handling



BEFORE: **Dirt, noise and mechanical breakdown** were constant problems in this cement plant, where two mechanical conveyors were used to collect raw materials. A 5 h.p. motor driving auxiliary equipment wasted valuable space and power, required frequent maintenance. Spillage clean-up wasted costly man-hours.

AFTER: **Clean, simple, quiet.** Notice the difference two 8" F-H Airslide® fluidizing conveyors have made. No dangerous moving parts. Nothing to lubricate. Auxiliary equipment and foundations are gone. Power needs are now only 1/6 of previous needs. Fluidizing saves wear and maintenance.

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minimizes material loss . . . maintenance . . . moving parts

If you are now handling dry, pulverized materials, the F-H Airslide Fluidizing Conveyor can help you stop noise, and air-pollution, as well as speed flow and reduce maintenance cost.

Simplicity Itself

F-H Airslide conveyors fluidize dry, pulverized materials with low pressure air.

These materials literally flow at high speed, down the inclined conveyor. Power requirements are small.

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For unlimited applications, Airslide conveyors take up little space, and can be used singly and in combination with other Fuller pneumatic conveying systems. The movement of fluidized material can be around corners, between floors, through walls—nearly any conveying distance.

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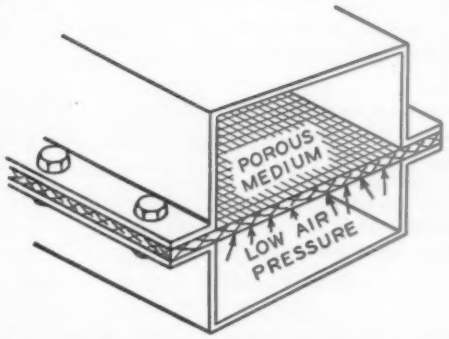
Can Fuller conveying systems help eliminate your housekeeping problems—cut your maintenance and handling costs? Write today, outlining your problem in handling dry, finely-divided materials. Fuller will gladly make appropriate recommendations.

"Pulverized Materials Flow Like Water!"



FLUIDIZING PRINCIPLE: Porous supporting medium divides conveyor section into two "compartments". Dry material flows down inclined conveyor, fluidized by low-pressure air entering beneath porous medium.

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water

comes in oceans, rivers, lakes, wells,
drops, buckets, pitchers and glasses.
it quenches thirsts, cooks food, puts
out fires, makes coffee and
brushes teeth. it spins mills,
runs electro-plants, cools motors
and power factories.
it spawns fish, sprinkles lawns,
floats boats, washes children
and grows flowers.

it sustains and nurtures.
it bends if you give it purpose.
it reshapes itself if you give it reason.
it is needed, wanted, feared,
praised and prayed for.

it is at the heart of all life.
it is in the arteries of all industry.
it is as close to us as skin
but as taken for granted as sky.

the end of water seems unbelievable.
if it is not on the horizon, it is just over it.
if it is not within sight,
it is just 'round the bend.
if it is not in the glass,
it is just in the spigot.

. . . this is the grand mirage . . .
the self-delusion that prevails
though the wells run low
and the streams go dry
and the water slips away.

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we know its ways.
we've learned its habits.
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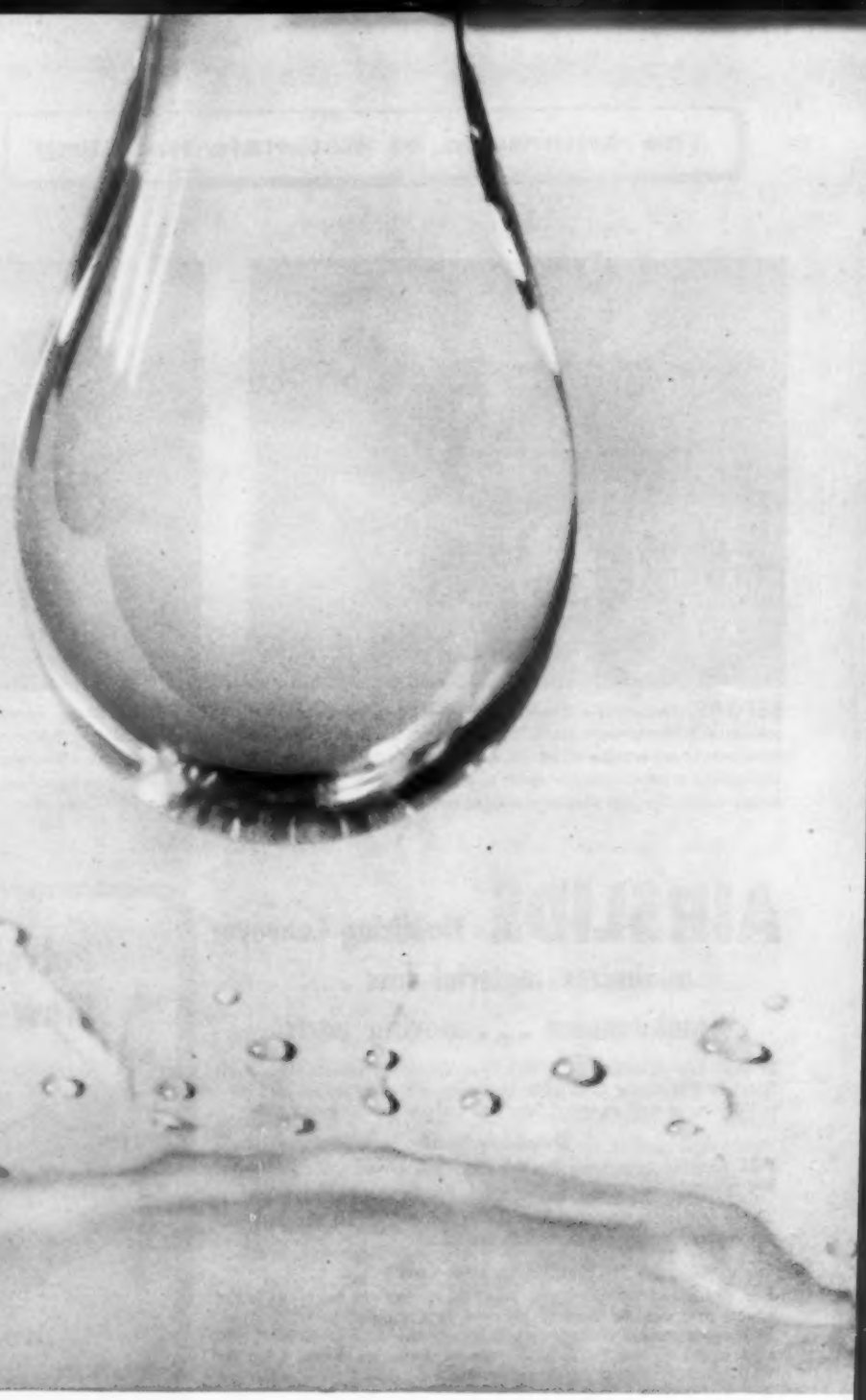
pushed it over mountains,
pumped it into deserts,
tunneled it through granite,
and rescued it from pollution.

above all else,
we know the need for it.
that is why,
for 130 years,
we've developed new uses for,
powered new factories with,
diverted the courses of
and jealously stood guard over
water.



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Send for our brochure—"Hydrodynamics." Please write to Mr. Robert W. Kerr, President, Fairbanks, Morse & Company, 600 South Michigan Ave., Chicago 5, Illinois.

continued from page 128

NEWLY ELECTED OFFICERS of NSGA line up with retiring president E. Phil Gemmer, left. Incoming officers (2nd from left, to right) include: F. P. Curtis, vice president; E. K. Davison, president, and H. E. Bender, secretary-treasurer

the far reaching legislation, to avail yourself of good legal talent and let the expert untangle the legal strings for you.

The full program for the NSGA Convention appeared on pp. 160 and 161 of ROCK PRODUCTS, February 1960 issue. If detailed information on individual papers is desired, contact NSGA headquarters in Washington, D.C.

The 1960 NSGA Convention was tabbed the best so far. And so were the equipment exhibits, which required a record number of square feet of space in the Chicago Coliseum and Conrad Hilton Hotel. More than 7,000 registered for the program.

New officers of NSGA include E. K. Davison of Pittsburgh as president. He succeeds E. Phil Gemmer of Houston, who served for two years. As chairman of the Public Relations Committee, Mr. Davison has given much of his personal time to the Association. That group has developed a program that has grown in size and value over the past few years.

Fred P. Curtis of Omaha was elected vice president of NSGA, rising from the post of secretary-treasurer, which he handled expertly. The new secretary-treasurer is Harry E. Bender of Azusa, Calif. Like the other incoming officers, Mr. Bender has served the Association long and well in several important capacities.

A Conference on the Operation of State and Area Associations was held Tuesday, Feb. 16, preceding the opening of the formal NSGA program. The Conference was arranged by H. G. Feraud, leader of the sand and gravel group of California for many years. Mr. Feraud has taken responsibility for the programs of this type at NSGA conventions for a long time. The Association honored him for his long and faithful work and publicly announced that he would receive a plaque to signify that honor at the convention in 1961.

The president's report by Mr. Gemmer included a glowing account of NSGA's efficiency in operation through work of the Washington staff. This group is headed by Vincent P. Ahearn, who was given the new title of managing director at this meeting. His capable assistant is Kenneth Tobin, who was named associate managing director. Stanton Walker directs all of the Association's engineering and research work.

"Our Association can hardly be classed as small business," said Mr. Gemmer. About 20 people compose the staff, and more space to accommodate this group was obtained in December 1959 by moving to larger quarters at 1411 K St., N.W., in Washington, D.C. NSGA work is divided into two parts—executive and engineering. The personnel who direct it and the excellent work they do were praised by Mr. Gemmer. He said that, in his opinion, the greatest accomplishment of NSGA—that which meant most to him and his company—was that of getting and interpreting the 5-percent depletion legislation. "Evaluation of it will show that, in comparison, Association dues are negligible," he said.

The biggest single cost in the sand and gravel industry is transportation. This is contrary to an assumption that the big cost is for labor, according to Ellis E. Jensen, president of Janesville Sand and Gravel Co. in Wisconsin. He blasted another theory, too. According to the Interstate Commerce Commission, all short-haul tonnage is unprofitable to the railroads. Instead, pointed out Mr. Jensen, short-haul traffic is not only profitable, but is necessary to the growth of the railroad industry.

"Railroad revenues do not improve because the railroads are barking up the wrong tree," he cautioned. According to the wealth of information on the subject collected by Mr. Jensen, railroad freight business is paying for nearly one-half the cost of passenger traffic in addition to its own cost.

What is the answer, as far as reasonable freight rates for sand and gravel and other commodities

Please turn to page 134

EVERY TYPE—EVERY USE

SKF®

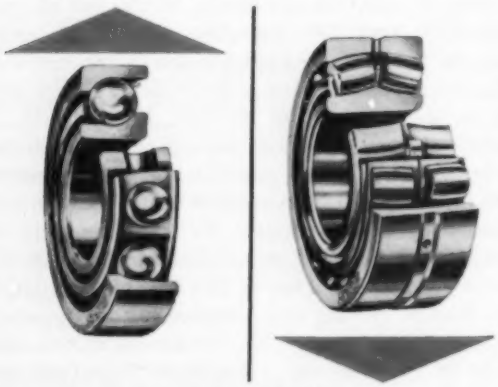
INDUSTRIES, INC., PHILADELPHIA 32, PA.

Spherical, Cylindrical, Ball, Timken® Tapered and REED Miniature Bearings

ANGULAR CONTACT BALL BEARING

This is the bearing to use when you need a high-speed bearing to support either (a) heavy thrust load, or (b) thrust load combined with radial load. It lends itself to various mounting arrangements. For example, if you need axial rigidity and high radial capacity you can mount two of these bearings in pairs either face-to-face or back-to-back. Or, if very high thrust capacity is needed, you can mount two or more of these bearings in tandem.

This standard bearing is available in over 80 sizes of single- and double-row types. Bore sizes range from ¾" to just over 7".



SPHERICAL ROLLER BEARING

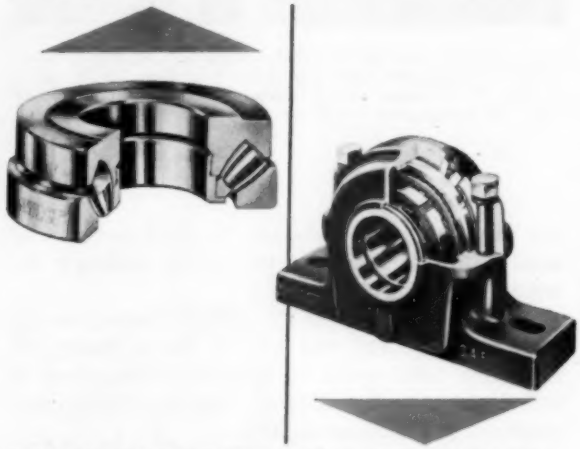
SKF invented the spherical roller bearing almost forty years ago. Since then, we've improved the original design several times—so that, today, our Type "C" spherical roller bearing offers longer life and 33⅓% greater capacity.

This increased capacity is largely due to the number, size and shape of the rollers—and the improved accuracy with which they're guided. Because these bearings are inherently self-aligning, their full capacity is always available for substantial thrust load in either direction as well as heavy radial load. These bearings also have special lubricating grooves that channel lubricants directly to the spherical rollers.

SPHERICAL ROLLER THRUST BEARING

Need a thrust bearing capable of carrying unusually heavy loads? Then specify this self-aligning spherical roller thrust bearing. It will carry either heavy thrust or combined thrust and radial loads. Because of its ability to carry high thrust at high speeds, this bearing is frequently chosen over large angular contact ball bearings for heavy-duty applications.

SKF makes this bearing in twenty-five standard sizes ranging from 4.3" to 14.9". And it's competitively priced.



TYPE SAF PILLOW BLOCK...with self-aligning ball or spherical roller bearings

Here's a rugged cast-iron pillow block that provides high efficiency with low friction.

We make this split pillow block with ball bearings for normal loads and with spherical roller bearings for heavy loads. We also equip it with Triple-Seal rotating rings that effectively protect the bearing from abrasives and corrosives, and prevent oil or grease from leaking out.

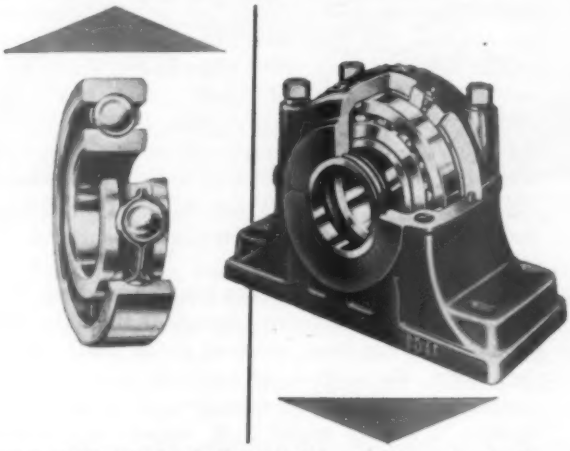
This pillow block can be mounted directly or with an adapter. Stabilizing rings are provided at no extra cost for applications where a "held" bearing is required to maintain shaft location. For heavy-duty applications, a cast steel housing (Type SAFS) is available. Shaft sizes from ¾" to 10½".

Only SKF can offer you unbiased bearing recommendations—because only SKF produces all four major types of anti-friction bearings: spherical, cylindrical, ball, and tapered roller bearings. For complete details on each type, just call the nearest of the twenty-four SKF sales offices.

SINGLE-ROW DEEP-GROOVE BALL BEARING

Here's a ball bearing that does two jobs, and does both of them well. It sustains heavy radial load as well as thrust load in either direction. Not only that, this bearing can be grease-lubricated when used at normal speeds and lubricated with oil at high speeds.

Yet this is a standard SKF bearing, mass-produced in various sizes at our automated Altoona (Pa.) plant. It's available in over 100 sizes ranging from over 5/8" O.D. to almost 16" O.D., and with various seal, shield and snap-ring combinations.



TYPE SDAF PILLOW BLOCK...with spherical roller bearings

Need an exceptionally sturdy pillow block? One that can withstand abnormal shock loads or heavy thrust loads day after day? Then specify SKF Type SDAF.

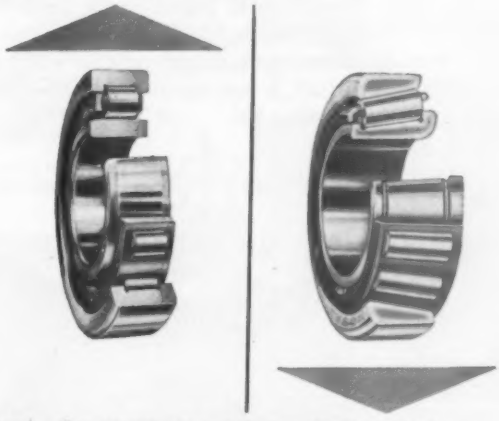
To provide maximum strength, four heavy bolts secure the cap of this pillow block to the base. Both halves are accurately aligned by dowel pins. And like the Type SAF, this pillow block comes equipped with Triple-Seal rotating rings that protect the bearing from foreign matter and retain the lubricant.

Type SDAF pillow blocks are made of cast iron but are also available in cast steel (specify Type SDAFS). They can also be mounted directly or with an adapter. Shaft sizes range from 2-11/16" to 14".

CYLINDRICAL ROLLER BEARING

Got a space problem? Here's a bearing that gives you high radial capacity—at very high speeds—in relatively small space. It's the SKF cylindrical roller bearing—which provides high radial capacity and minimum shaft friction. Controlled shaft end float within this bearing is a natural advantage of its design.

You can get prompt delivery in 154 bore sizes ranging from just under 1" to 6". Double-row cylindrical roller bearings are also available in bore sizes from 1" to 9.5".



Tyson* TAPERED ROLLER BEARINGS

What type of tapered roller bearing do you need: single-, double- or four-row? SKF's division, Tyson Bearing Company, makes all three of these types in a wide range of standard sizes.

The single-row type is especially suitable for carrying radial loads simultaneously. Double-row types are designed for use where the radial capacity of two single-row bearings is required. For special applications, the four-row type offers very high radial capacity in limited space.

All Tyson tapered roller bearings are interchangeable, size for size, with other makes of tapered roller bearings where the part numbers are the same.

8949

*REG. U. S. PAT. OFF.

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NATIONAL SAND & GRAVEL ASSOCIATION MEETING REPORT

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are concerned? Mr. Jensen suggests a government subsidy. He supposes that this may be Socialism, but so is the Post Office and public schools, he pointed out. In his summary, he suggested that: (1) rumors that the railroads are broke are pernicious; (2) railroads are as sound as many corporations in the land; (3) railroads suffer because of passenger losses; (4) railroads should get out from under "feather bedding," and (5) railroads need more short-haul traffic "at reasonable rates" to make them well.

Do land reclamation programs pay for the sand and gravel producer? "I propose that they do," declared Donald I. Battjes, Grand Rapids Gravel Co., Grand Rapids, Mich. In some cases, redeveloped land actually brings in more than the original cost.

The best way to plan a land reclamation project is to begin by considering the location of the property. Get your engineers to look it over, come up with a good program for development, then take it to the Zoning Board and Planning Commission. Most important of all, when the plan is approved, let the public know about it.

What are the benefits, in addition to a good capital investment? Mr. Battjes thinks that you'll have the best public relations program possible. In his Michigan project, the public was sold on an idea with much planning behind it.

The full story of his program appeared in the June 1959 issue of ROCK PRODUCTS, p. 106.

Fiscal matters are getting much attention. Convention reports on such matters show that the Association, through a Joint Committee on Fiscal Policies with the National Ready Mixed Concrete Association, headed by Henry H. Kirwin of New York, is getting good information ready for distribution to members. A loose-leaf ring-binder service should be in members' hands by the middle of the year. It will contain prepared material covering six sub-classifications of fiscal information: (1) fiscal accounting, (2) cost accounting, (3) budgeting and forecasting, (4) industry cost-ratio studies, (5) special studies and (6) general.

The study of cost ratios already has started for both the ready-mixed concrete industry and the sand and gravel industry. Two annual studies have been made by questionnaire of the former industry and one for the latter industry. Scattered and inadequate returns from the sand and gravel industry prevented any compilation suitable for distribution.

The second report for the ready-mixed concrete industry was even more successful than the first one. And it has been received enthusiastically by producers. Each producer can now check his own performance with the combined data from producers in any of eight U. S. regions and one in Canada.

Why make these studies available to member-

Please turn to page 136

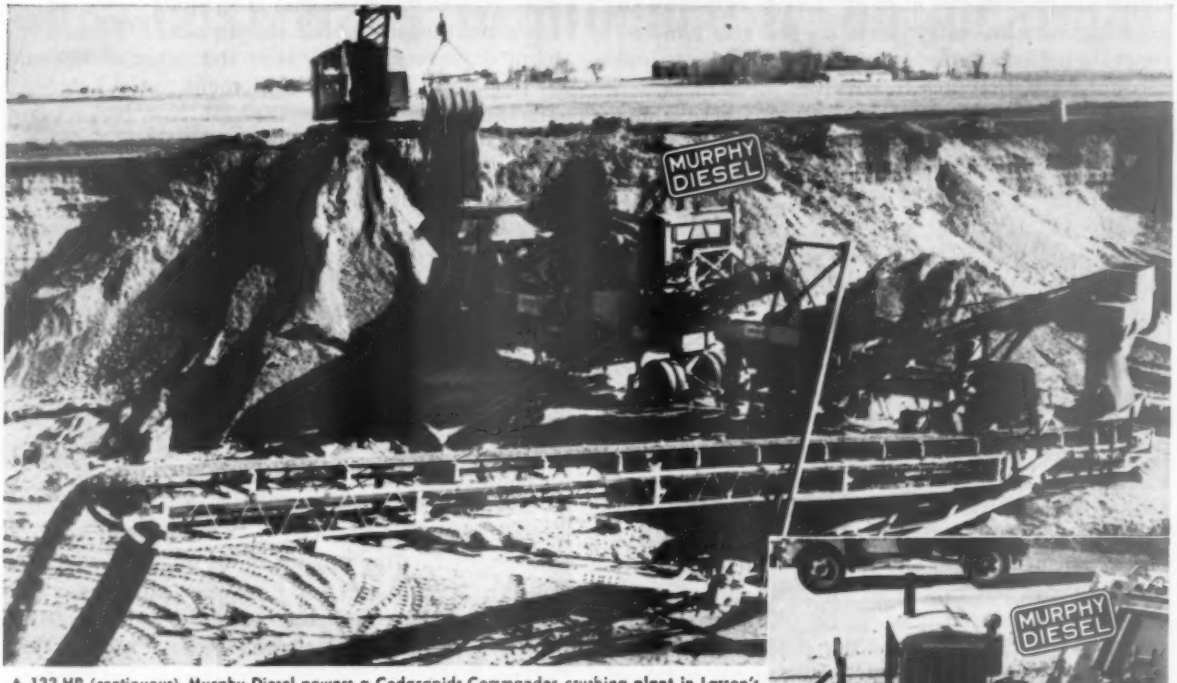
FULL-SIZE MODELS attracted plenty of attention—pretty girls described the features of mammoth earth-moving equipment shown at the Coliseum in Chicago

RIGHT: Scale models of outstanding materials handling systems also attracted a great deal of interest

HERE'S HEAVY-DUTY WORKING POWER BY

MURPHY DIESEL

FOR A 2-MILLION TON PER YEAR AGGREGATE PLANT



A 133 HP (continuous) Murphy Diesel powers a Cedarapids Commander crushing plant in Larson's George Pit, near Joliet, Ill. This plant produces approximately 2200 tons of road aggregate per day.

Elmer Larson, Inc., of De Kalb, Illinois, one of the Midwest's largest aggregate producers, has produced around 25 million tons in the past 30-odd years. Owners Elmer and Leon Larson know the value of equipment that is engineered for *hard work*, with dependability and economy. That's why they chose Murphy Diesel power for the plants shown here.

Murphy Diesels give you the kind of *usable, hard-working* power you need, delivered into the job. Murphy power takes hold of a load and really hangs on. Murphys' good lugging power is the result of high rising torque. This helps keep your equipment at the right operating speed for efficient production and more profit. And Murphys get every ounce of power out of every drop of fuel. When you see your Murphy Diesel Dealer for proof, ask about low maintenance and economical operation, too.

At the Sears Pit, Sycamore, Ill., a 203 HP (continuous) Murphy Diesel powers a Cedarapids Double Impeller Impact Breaker primary. This pit produces 1700 tons per day of road rock, aglime, concrete aggregate, and stone chips.

MURPHY DIESEL

MURPHY DIESEL COMPANY

5315 W. Burnham St., Milwaukee, Wisconsin

SALES . . . PARTS . . . SERVICE

Throughout the Nation

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PUTS MORE POWER INTO THE JOB

MP Series Murphy Diesel engines and power units are available in sizes from 105 to 320 HP with engine speeds of 1200 and 1400 rpm. "Packaged" generating units are available with capacities ranging from 60 to 188 KW.

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continued from page 134

ship? Kenneth Tobin stated, "Every company in a competitive industry such as the ready-mixed concrete industry must have a system of costs and accounting if they are to survive."

Results of the RMC study gave the percentage of total costs and costs in cents per cu. ft. of concrete for the following cost categories: aggregates, cement, operating costs, depreciation, rentals, delivery costs, other costs and profit before taxes. According to the report, the average ready-mixed concrete producer made a profit of only 4 percent of net sales this last year.

Don't look for Congress to make extensive revisions in the Internal Revenue Code this year. They'll take a good hard look at it and maybe will make some minor changes covering loopholes, manufacturing processes for the brick and cement industries and, possibly, on useful life of equipment. According to John T. Sapienza, counsel for the Associations, major changes will eventually be made; but not this year.

Depreciation continues to be one of the most controversial areas in the tax field, he reported. Congress is well aware of the difference between the flat 52 percent tax on profits and the maximum of 25 percent tax on capital gain from a sale. The government's attitude differs from the taxpayer's on salvage value, too. A taxpayer may believe that salvage value is that value of a piece of equipment at the end of its physical life—government disagrees, saying it is the value at the end of the useful life of the equipment to the business. Mr. Sapienza suggests that, if the government wins the three cases now before the Supreme Court, each producer should settle on an individual basis. Then, he should get together with his accountants and set up a good depreciation schedule.

The business of expense accounts is getting a lot of attention by the Treasury Department. The Association has circulated an analysis of Treasury rules on this. But Mr. Sapienza urged that both employer and employe keep detailed records of expense accounts. Although the burden is on the employer, an employe may have to make a detailed accounting if the revenue agent decides that the accounting method of the employer is inadequate.

Percentage depletion continues to be a cloudy and confused issue. And it probably will be until the Supreme Court hands down a definite decision on the Cannelton Sewer Pipe case, now under consideration. Mr. Sapienza reminded producers that the concept of depletion was under attack in Congress, in congressional committees, in the Supreme Court and in the Internal Revenue Service. There may be no new laws until a decision is reached, but the outlook for realistic, equitable legislation on percentage depletion is very dim indeed.

Dana Latham, commissioner of Internal Revenue, enlarged on this theme with a few pointed remarks. It was his opinion that the courts have not made the correct interpretations of the laws on depletion—this would explain the revenue service's tenacity to bring new cases to litigation in the face of adverse decisions. Further, it was his opinion that if the decisions of the lower courts are upheld in the cases before the Supreme Court, they would yield absurd and inconsistent results.

But Mr. Latham made it clear that once the law was clearly determined by the Supreme Court, the Internal Revenue Service would be happy to follow the law. There are still several problems to be thrashed out, either in law or regulation, before percentage depletion ceases to be a bone of dissention between taxpayers and the service: the technical terminology must be more clearly defined, and the cutoff point for determining product value must be established. Unfortunately, this may not be easily done since the existing complex tax laws are only a reflection of a complex economy.

Safety was another high point in the program with the presentation of the ROCK PRODUCTS awards to the winners. Trophy awards were made

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LEFT: Dean James L. Hayes, Duquesne University, outlines his philosophy for better management: "Delegate the bread-and-butter jobs . . . let every man have a monkey on his back"

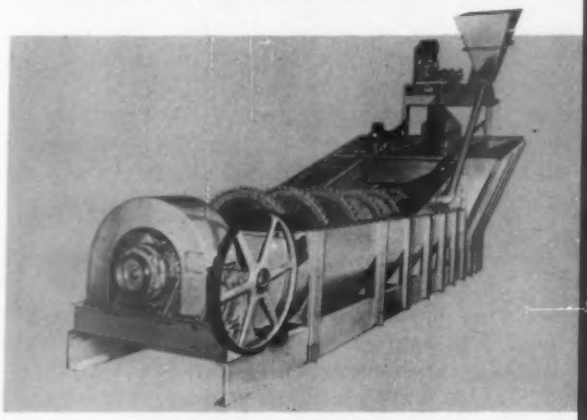
RIGHT: Ellis E. Jensen: "Efforts to control costs cannot stop with production costs . . . biggest cost item in our industry is transportation to market"

Need specification aggregate?

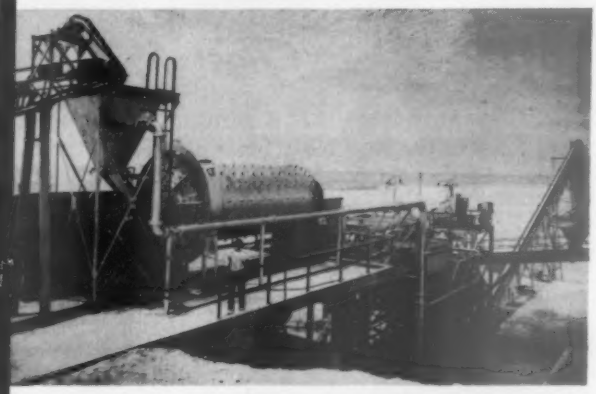
4 low-cost ways to produce it, on location!

1 *Grinding with Marcy CPD Rod Mills*
Grinding stone or waste pea gravel in a Marcy Mill results in a superior, cubical product for blending to meet the most rigid specifications. Marcys have kept many small operators in business; and, have been used on almost all large government dam jobs.

2 *Washing and Classifying with Akins Classifiers* With the Akins Classifier you can wash, deslime, dewater, and *remove or save* sand sizes as desired. A large *working* pool area in classifier is required to do this work...the Akins gives you more working pool area per dollar.



3 *Separating with Akins Heavy Media Separators* Many deposits can be most efficiently treated by the Akins heavy media process. The Akins' large *working* pool area permits close control of products from feed of variable quality or quantity. Reduced media recirculation in the Akins results in lower total horsepower required.



4 *Scrubbing with Marcy Heavy-Duty Scrubbers* Thorough, efficient removal of clay from sand can be accomplished with Marcy Scrubbers. The Marcy principle of small diameter, long length scrubbers gives longer retention time, more contact for scrubbing, less short-circuiting, and lower horsepower...a principle which has been proven on difficult washing of iron ore.

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NATIONAL SAND & GRAVEL ASSOCIATION MEETING REPORT

continued from page 136

LEFT: Stanton Walker discussed finished screening: "We can expect more gradation controls in aggregates producers' plants and at ready mix producers' plants"

RIGHT: John S. Walker explains how the White Marsh plant of Harry T. Campbell Sons' Corp. maintains gradation control in its 750-tph. sand and gravel installation

to the Irwindale plant of Consolidated Rock Products Co., Los Angeles, Calif.; to the Indianapolis (Harding St. plant) of American Aggregates Corp., and to the Kaw No. 2 plant of Stewart Sand & Material Co., Kansas City, Mo. Certificates were presented to representatives of 19 sand and gravel plants who have compiled records of five or more consecutive years without an accident.

Production problems were not overlooked, by any means. Those who operate dredging equipment were vitally interested to know about Dravo's new dredge. This unit works the Ohio River near Pittsburgh and incorporates many features unusual in dredges. (See ROCK PRODUCTS, March 1960, p. 98, for details of this installation.) G. C. Cooley carried out the theme of dredge operation by discussing the experimental operation of a jet nozzle dredge. While the design is not new, its full potential has never been fully developed.

Heavy media has been worked into the circuits of a plant which already had installed a system of elastic fractionation. Now it is possible for Whittaker & Gooding Co. of Ypsilanti, Mich., to remove both the soft, friable contaminants and the heavy, absorbent materials from the raw gravel feed. This problem is peculiar to Michigan, but there is every possibility that there are similar gravel deposits in other states which could use the same system.

A detailed report on the operation of a 1,000 tph. sand and gravel plant was made by John S. Walker of Harry T. Campbell Sons Corp. The construction of this plant had been covered two years ago when the late Richard Campbell told the NSGA about it. The system has only recently been fully completed, proving that it takes continuous operational research in addition to good basic design to bring a big sand and gravel plant to peak efficiency.

Aggregates have a profound influence on the quality of the finished product they are used in. But in spite of all the research that has been done, there is still no clear cut definition of what these influences are. We not only have not determined precisely what qualities we must have in aggregates, but have not developed uniform, reliable testing techniques. This was the thesis Delmar L. Bloem, associate director of engineering for the NSGA, developed at the meetings.

But there is a lot of work being done to attempt to improve the situation. The Association staff conducted 129 research projects and tested over 3,500 samples of materials. Preliminary conclusions seemed to show that (a) the optimum size of coarse aggregate seems to be about ¾ in., (b) shrinkage of concrete seems to decrease with increasing size of coarse aggregates, (c) the soundness of the aggregates, and (d) adsorption and abrasion tests of aggregates show very little correlation to the soundness of concrete made with them. In conclusion, Mr. Bloem stated that we need much more engineering evaluation and not quite so much arithmetic when evaluating the quality of aggregates in relation to the strength of the concrete made with them.

Stanton Walker outlined some of the absurdities which may occur when specification writers dictate production methods rather than define the specification of the finished product. One of the production methods specified on more and more ready mix jobs is that of finish screening to control gradation. This requirement has been widely adopted in the face of virtually no supporting data, and there are very few genuine examples of where finish screening would be justified. Apparently the specification writers are arbitrarily projecting their experience from heavy construction into the ready mix field.

But arbitrary or not, the sand and gravel producer can look forward to wider adoption of the requirement for finish screening. Otherwise the burden will be on the producer to demonstrate that

Please turn to page 142

A case history of Bemis service that could mean a lot to you

Our principal business, of course, is to sell bags in any honorable way.

But we much prefer to sell them through service, such as we have had the opportunity to render over the years to General Material Company, St. Louis.

The General Material–Bemis case history, related chronologically here, shows some of the many ways in which Bemis is able and anxious to work with customers:

1952 General Material Company, a ready-mix business packaging its product under the trade name "Pree-Mix," is launched. A Bemis specialist advises the young company on bag construction and design, and assists in setting up a packing line.

1956 General Material outgrows initial plant, constructs new plant with much greater capacity. To handle the increased output, Bemis Packaging Service representatives work with company officials and install complete Bemis packing line: Bemis Gravity Packer, Vee-Trof Conveyor and Bemis Sewing Machine Pedestal. Mr. Martin W. Melican, plant superintendent, states that "the use of the Bemis Gravity Packer has been instrumental in doubling the output of our products."

1960 Now an established company, General Material still receives close personal attention from Bemis multiwall specialist who keeps Mr. Melican and others informed of such new developments as Bemis Extensible Multiwalls. This close personal attention is typical of Bemis service.

This case history deals with one specialized phase of the rock products industry—but it indicates the wide range of facilities, technical skills, and packaging experience that Bemis makes available to all customers. If you would like to discuss your own packaging operation with a Bemis man, write today.

Where flexible packaging ideas are born

GENERAL OFFICES 408-M PINE STREET, ST. LOUIS 2 • SALES OFFICES IN PRINCIPAL CITIES

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Over 15 ft. per hr. through solid granite

with Stardrill-Keystone KF-50 rotary gun drill

This production — reported by B&R Diamond Drilling Co., of El Cajon, California — shows again why more Stardrill-Keystone rotary drills are sold for the tough jobs. On the KF-50 application pictured, operator used tricone rotary rock bit to drill down to solid rock, then switched to down-the-hole air hammer to sink 15 ft. per min. through solid blue granite. Water-cooled piston compressor lifted cuttings thru water from 300 ft.

Handles scattered mine, quarry work

Heavy duty in every respect, the KF-50 mounts a Cummins diesel engine, a 500 CFM two-stage compressor, a 158 gpm duplex piston mud pump, and has retractable rotary table. Variable-speed pull down, with infinite feed adjustment from 0 to 20 ft. per min., insures maximum permissible hole production in any type formation. Bit pressures to 30,000 lbs. are obtainable. Depending on your needs, mud pump can be omitted, with larger-capacity compressor available.

Get the complete story on the truck-mounted KF-50. You'll find it "has what it takes" to cut your costs on blast hole drilling, sampling, and exploratory work. Get in touch with your Stardrill-Keystone distributor, or write for complete specs.

Stardrill-Keystone offers a wide range of rotary, down-the-hole, and combination drills, tools and attachments for mining and quarry applications. Your Stardrill-Keystone representative is available to make specific recommendations for your particular problem without obligation.

STARDRILL-KEYSTONE

BUFFALO-SPRINGFIELD • *Division of Koehring Company*

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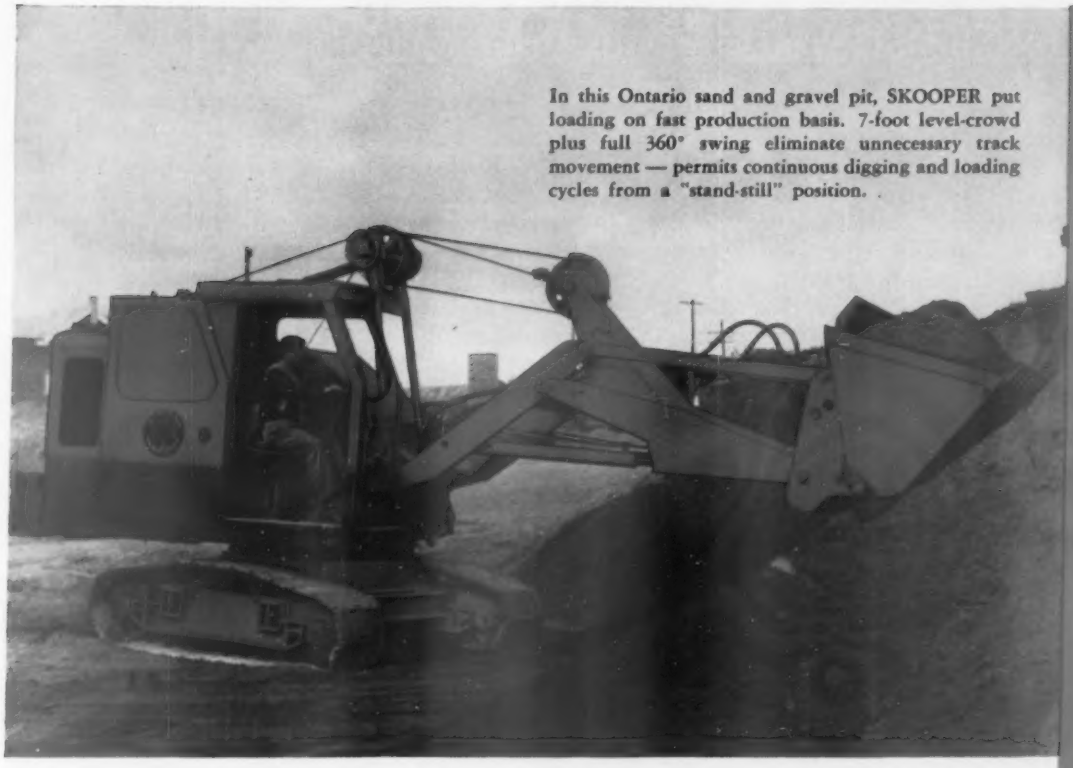

In this Ontario sand and gravel pit, SKOOPER put loading on fast production basis. 7-foot level-crowd plus full 360° swing eliminate unnecessary track movement — permits continuous digging and loading cycles from a "stand-still" position.

KOEHRING SKOOPER

There's nothing like it—on wheels or Tracks!

SKOOPER combines big bucket capacity of front-end loaders . . . with the fast, smooth swing of an excavator turntable

Now you can do big bucket digging and loading *without* the usual drive-in back-out waste motion of tractor front-end loaders . . . *without* the high track or tire maintenance of a skid-turn operation. Follow Koehring SKOOPER through a typical dig-swing-dump-return cycle . . . check its *economy of motion:*

Powerful action of twin hydraulic rams crowds the 2-yard bucket along a smooth 7-foot level clean-up from "stand-still" position . . . or cuts any angle of bank slope. Next, SKOOPER swings . . . dumps load fast, clean from roll-over bucket . . . then swings back, starts next cycle . . . all *without traveling.* Or . . . at any time, SKOOPER can swing and travel simultaneously. Work with crawlers parallel to cut, or headed into bank. Has 3 types of interchangeable buckets (rock, re-handling, general purpose).

See for yourself

Check this revolutionary SKOOPER in action. Stop-watch its fast cycle time . . . see for yourself how many tons it moves per hour with only 64 H.P.! Also check its low maintenance cost, and unique advantage of excavator-crane convertibility. Call Koehring® distributor, or write.

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NATIONAL SAND & GRAVEL ASSOCIATION MEETING REPORT

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he can control gradation of aggregates at the user's plant without setting up additional screening circuits in his own plant.

"Inside Washington" could have been an alternate title for Mr. Ahearn's report on the Washington scene. From his vantage point in the nation's capital he observes the ebbs and flows of controversy, the changing tides of politics. While the Grand Ballroom at the Hilton was filled nearly to capacity, it is unfortunate that more members of the Association could not have heard this masterful essay on modern political science. For Washington is having more and more to say about the profitability—even the continued existence—of an increasing number of producers in the rock products industry.

The Manufacturers Division of NSGA, in a Board meeting on Sunday, Feb. 14, elected Emil Deister, Jr., Deister Machine Co., its chairman for another year. Mr. Deister moved into the position as chairman upon the resignation of William Rundquist this past year. New vice chairmen of the Division are: John Dunn, Allis-Chalmers Mfg. Co.; Harry F. Lawrence, The W. S. Tyler Co.; John Steffins, Ludlow-Saylor Wire Cloth Co., and Herbert Knudten, The Universal Engineering Co.

The next biennial show will be held during the week of Feb. 12, 1962, at the new Chicago Exposition Center. The members of the Division requested that the NSGA Board of Directors be asked to consider a joint show with the National Crushed Stone Association at that time, and also to consider holding convention meetings at the Exposition Center.

WINNER OF ROCK PRODUCTS' FIRST DAILY PRIZE was drawn by Mrs. Paul McKinney of Wheaton, Ill.

The next meeting of NSGA will be its 45th Annual Convention at the Hotel Americana, Bal Harbor, Fla., Jan. 23-26, 1961. The Board of Directors of NSGA will hold its semi-annual meeting in conjunction with the Board of National Ready Mixed Concrete Association Oct. 3 to 5, 1960, at the Del Monte Lodge, Pebble Beach, Calif. The 1961 meeting of the Board of Directors will be held Aug. 14 to 16 at the Greenbrier, White Sulphur Springs, West Virginia.

The Board of Directors of NSGA conducted its business on Tuesday morning, Feb. 16 and met jointly with the Board of the NRMCA in a luncheon meeting that day. The agenda was a full one. The Board named the following as members of the executive committee: Joseph L. Shiely, Jr., C. G. Cooley, A. H. Smith and Chas. E. Brady. New Directors-at-Large elected are Irving Crown, H. H. Kirwin, A. H. Smith, Irving Warner, C. E. Brady and J. H. Reid.

The Traffic Committee report by Mr. Brady and Mr. Ellis Jensen revealed the details of a successful battle against one of the most vicious problems ever to confront the Association. Last fall in New York, eastern railroads proposed a rate schedule in which freight rates would be increased to the point of excluding sand and gravel haulage entirely. In the face of excellent staff and committee work with the cooperation of Mr. Jensen, the proposal was withdrawn. The Board recognized the important part played by Mr. Jensen by presenting him with an alarm wrist watch along with highest appreciation on behalf of the Association.

Engineering and research activities of the Associations were reported by Stanton Walker, director of engineering. A full report has been sent to members, but Mr. Walker highlighted the work being done in connection with technical societies. The Short Course has been popular, and is growing. Mr. Walker feels that this year he will be able to take care of all who wish to enroll for the course. Participation has been limited in past years.

The NSGA-NRMCA Joint Research Committee was given a new name, and the scope of the work of that committee was enlarged. It will now be known as the Joint Committee on Research and Engineering Activities, and committee membership has been jumped to 12. **END**

Foote Bros. Drives In The Cement Industry

Team of Reducers GIVES PERFORMANCE PLUS Driving Marquette Cement's ACL Grate

Two Foote Bros. Reducers team up to provide a powerful, close-coupled drive for the ACL Chain Grate used in Marquette Cement Company's ultra-modern Milwaukee plant.

Dependable power—and plenty of it—was required to drive the head shaft of the 82 ft. long x 12½ ft. wide furnace grate which moves pelletized raw material through the drying and preburning chambers.

Problem: In a limited space, provide a right angle drive capable of delivering a final torque of 1,400,000 in. lbs. at the head shaft of the grate.

Solution: To provide the necessary reduction from a 20 HP variable speed motor, a Foote Bros. 224 SL concentric shaft Reducer was coupled to an 18 S Right Angle Worm Gear Reducer which drives a large spur gear set to turn the grate.

The smooth, steady, and positive grate travel provided by the team of Foote Bros. Reducers, is an important requirement of the carefully balanced Marquette process. Since going into service almost two years ago, the Drives have met every requirement of Marquette's design and production engineers for "no downtime" performance.

There's a Foote Bros. Drive made to meet your power transmission requirements. Ask your nearby Foote Bros. Authorized Distributor for information or assistance concerning your power transmission problems. He's ready to help you.

FOOTE BROS. F B **GEAR AND MACHINE CORPORATION**

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POWER TRANSMISSION DRIVES

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Solite didn't spare the spadework

by C. E. Wright*

IF YOU HAD A SAMPLE OF SOLITE from the new Florida plant at Green Cove Springs, and a sample of the material from one of the older Solite plants, you'd see no difference in them. And there isn't any, except that one (Florida's) is expanded clay, the other, expanded slate aggregate.

Chemically, they are the same, a fact ascertained in advance of the Florida plant's construction by giant Southern Lightweight Aggregate Corp., Richmond, Va. Noted for high-quality lightweight aggregate since it opened its first plant in 1947, the company couldn't afford to jeopardize a carefully built reputation.

For more than two years Southern Lightweight Aggregate Corp. wanted to enter the rich market in concrete-happy Florida. To do this, it had to find a suitable clay deposit having the same chemical properties of the slate used at the Virginia and North Carolina Solite operations. These operations, by the way, are handled by separately incorporated but affiliated companies: Southern Lightweight Aggregate Corp., Bremo Bluff, Va.; The Virginia Solite Corp. at Leaksville, N.C., and the Carolina Solite Corp. at Aquadale, N.C.

Finding the right kind of clay in Florida was not an easy job, even with the assistance of the state geologist. Much of the state is underlain with sand, muck, lime rock or oolite. The search involved the taking of many borings, which were chemically tested. Finally, a field that met every requirement was located about five miles from Green Cove Springs and 24 from Jacksonville.

Almost as important as the correct chemical content was the clay's percentage of moisture. If the clay had been too wet, the cost of removing

Please turn to page 146

*1727 San Marco Blvd., Jacksonville 7, Fla.

FLORIDA SOLITE CORP.'S PLANT at Green Cove Springs, Fla., operates continuously day and night

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Big production combination...

down-to-earth price!

OLIVER 888 with *REVERSE* O TORC

Looking for the low-cost way to pep up your stockpiling and loading? Put an Oliver 888 in your operations. This *inherently* faster, rubber-tired 1-yd. loader with "Reverse-O-Torc" puts a 17.5 m.p.h. working speed under easy, one-finger command. It's fastest in its class!

Add the total *ease* of handling the 888 gives you—shift-free, clutch-free back-and-forth cycling plus effortless power steering—and you come up with today's fastest, most maneuverable 1-yd. loader. Oliver puts instant forward-and-reverse control handy at your finger tip under the steering wheel—where it belongs.

Operating ease—you bet! Plus the biggest assist to profits any machine its size can deliver. You load fast, full and high—with the 888's torque converter and powerful hydraulic system joining forces to up production as never before.

Choose your Oliver 888 with "Reserve-O-Torc" and power steering options...and with smooth, 6-cylinder gas or diesel engine.

Check the Facts...Check the Price!
See how an Oliver 888 loader is the *low-investment* way to get instant, long-lasting loading advantages. Talk to your Oliver Distributor or write for illustrated catalogs.

LOOK TO OLIVER FOR YOUR BEST BUY IN WHEEL AND CRAWLER TRACTORS

THE OLIVER CORPORATION
Dept. 2232, 400 W. Madison St., Chicago 6, Illinois

SOLITE DIDN'T SPARE THE SPADEWORK

continued from page 144

the water would have been prohibitive. Satisfied that the Green Cove deposits met this requirement, Southern Lightweight Aggregate Corp. bought 250 acres and took options on 1,500 acres adjoining. The Florida Solite Corp. was formed as a separate corporation, a plant was built, a sales office was opened in Jacksonville, and the company was in business.

"This clay is very similar in composition to slate," said A. Floyd Old, vice president in charge of production for the Solite companies. "In tens of thousands, or maybe hundreds of thousands of years, it probably will be slate."

In processing the clay, Florida Solite Corp. uses the rotary kiln method. But the initial operation is to strip the overburden which runs about 6 ft. deep. A dragline is used for stripping and for removing clay from the deposit, extending for depths of 8 to 20 ft. Under ordinary conditions, clay is stored in the open air before firing, allowing the Florida sun to dry it out. These conditions did not prevail during the plant's first few months last summer. Instead, the state had to contend with the heaviest rains it had experienced in years. Clay was then stored under cover, moving outside when dry weather arrived. If the clay is quite wet, a de-airing system with a vacuum pump hastens drying.

After the clay is sufficiently dry, it is placed on a conveyor belt by a clamshell bucket and fed into one of the two rotary kilns where the temperature rises to 2,300 deg. F. During the 40 to 50 minutes in which it is subjected to this intense heat, the clay bloats into clinkers.

Glowing red, the variously sized clinker is discharged from the kilns. It is cooled, then dumped by a clamshell bucket into a vibratory feeder enroute to the jaw crusher. Three marketable sizes are produced: 3/8 in. to 0 for block; 3/4 in. to No. 4, and 1/8 in. to 0 for structural concrete.

Production continues 24 hours a day, 7 days a week. Shipping is simplified by the plant's location near the main line of the Atlantic Coast Line Railroad.

The Florida company had a selling job to do, despite the fact that the Virginia and North Carolina affiliates had established a solid reputation for quality aggregates. Florida concrete producers have long adhered to the heavier types of aggregate found in abundance in their state. So Florida Solite lost no time establishing that block made from its aggregate met ASTM specifications for load-bearing block. They shipped single carloads of the expanded clay aggregate to block manufacturers for testing.

Here's what the concrete producers found: Standard size units made with Solite average 23 to 25 lb. each (13 to 14 lb. less than the conventional heavyweight units). Tests also showed that the lightweight units are easier to handle, walls go up faster, and at a cost of about a cent a block less than with conventional units.

A special selling point is the fire resistance of the lightweight units, backed by Underwriters' Laboratory approval for two, three and four-hour ratings. So convincing was their selling message that block using Florida Solite have been sold to brick manufacturers for lining their kiln cars.

Further claims for Solite block are that they have a higher insulating value than conventional block, requiring less heating in winter and less cooling in summer. It has also been demonstrated in tests that they have a high sound-absorption value; that they are chemically inert, with no staining or rusting, and that they are malleable and nailable.

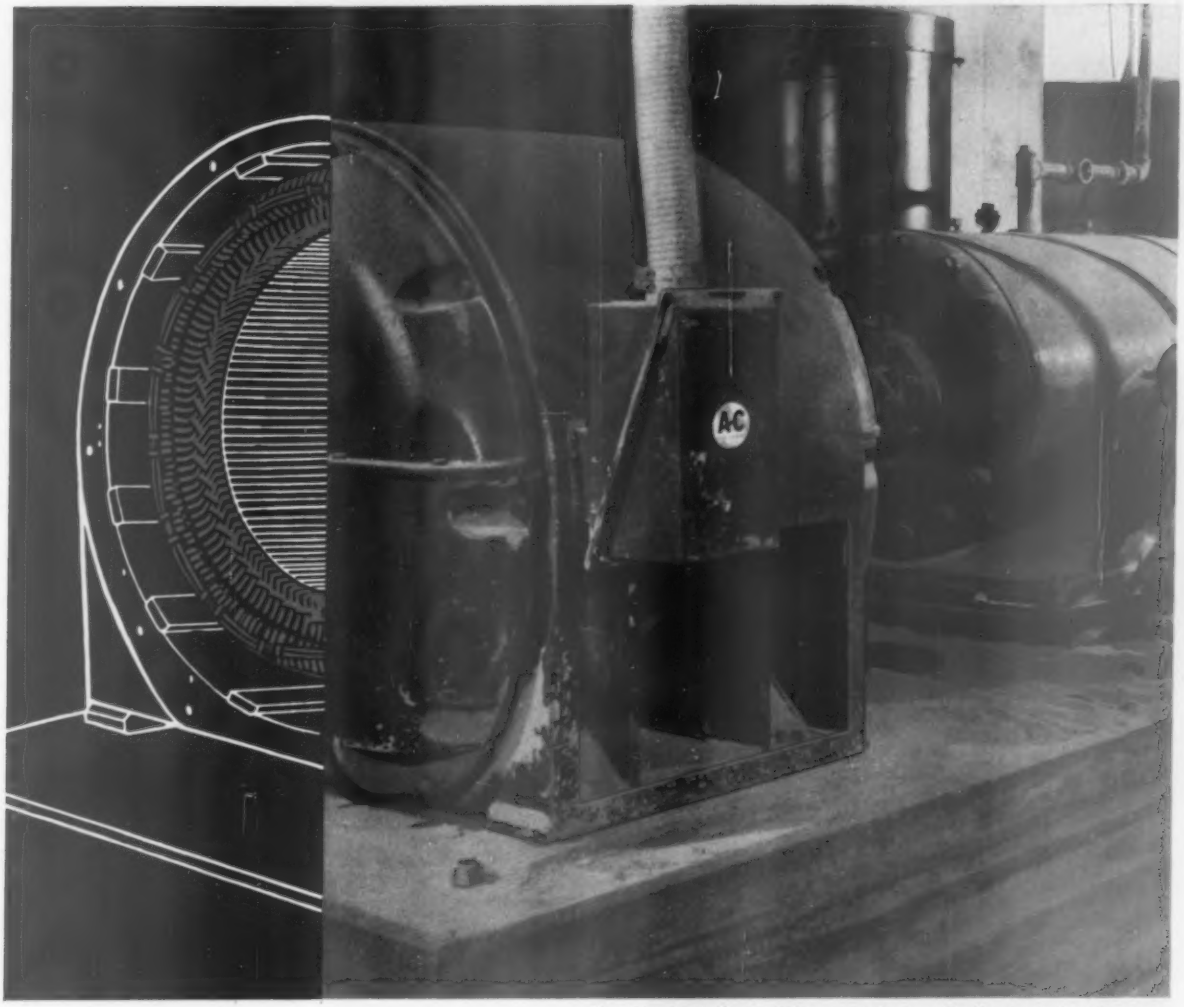
But promotion extends beyond the block market to the structural concrete market, including ready-mix, precast and prestressed concrete. The company had had considerable success in this field by demonstrating that there is a deadload weight-saving factor of about a third with no loss of strength. For example, structural concrete made with Solite weighs approximately 100 to 105 lb. per cu. ft. (dry weight), compared with 150 to 155 lb. for normal concrete. The strength factor is 6,000 psi.

The fledgling business has really got off the ground in its first year of operation, thanks to the production efforts of W. G. Schumaker, plant superintendent and the promotion efforts of George W. Jones, Jr., sales manager at Jacksonville. Solite has been used in the lightweight precast wall panels for the Atlantic Coast Line Railroad's headquarters building and the new City Hall, both in Jacksonville. The aggregate also has gone into tilt-up wall panels at the new state prison at Raiford and at other jobs in northern Florida. END

MAJOR EQUIPMENT REFERENCE

Clay processing equipment	J. C. Steele Co.
Rotary kilns (2)	McNally Pittsburg Mfg. Co.
Belt conveyor system	Peerless Conveyor & Mfg. Co.
Cranes (2)	Northwest Engineering Co.
Vibrating screen	Screen Equipment Co.
Gyratory crusher	Nordberg Mfg. Co.

ALLIS-CHALMERS



Silco-Flex insulation in this cement plant application has solved the problem of abrasive dust — one of the worst enemies of motor insulation.

Your major motor investments are protected by Allis-Chalmers

invisible standards of perfection

Allis-Chalmers motors prove the value of thinking beyond established design standards. This thinking, applied to research, development and manufacturing, has led to advanced design features which mean greater application versatility, exceptional reliability and extended motor life. These are invisible standards of perfection you get with Allis-Chalmers motors.

Silco-Flex insulation, for example, has completely changed the rules on open-motor application. It is impervious to moisture, oils, and most acids, alkalies and solvents. It is resistant to abrasion, and is capable of withstanding high temperatures. Its resilience provides durability to withstand shock and vibration.

Super-Seal motors, with *Silco-Flex* insulation, have proved themselves for more than five years under the most severe conditions in industry.

Advancements such as capsule bearings, split end housings, and *Integrated* field coils (for synchronous motors) add to the superior performance of *Super-Seal* motors.

They contribute to the invisible standards that protect your motor investments year after year — cut replacement costs — assure uninterrupted production.

To learn more, call your nearby A-C representative, or write **Allis-Chalmers,** *Power Equipment Division, Milwaukee 1, Wisconsin.* A-1292

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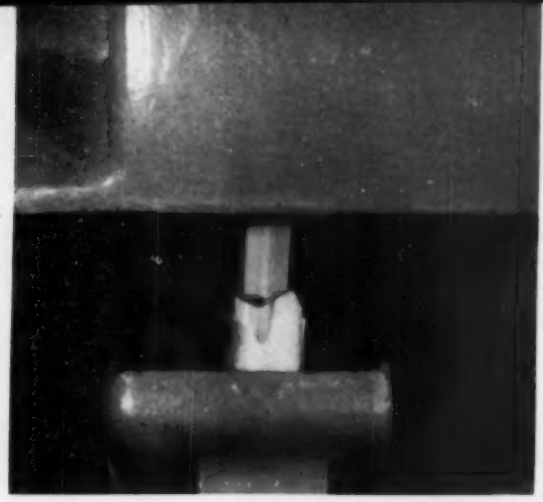
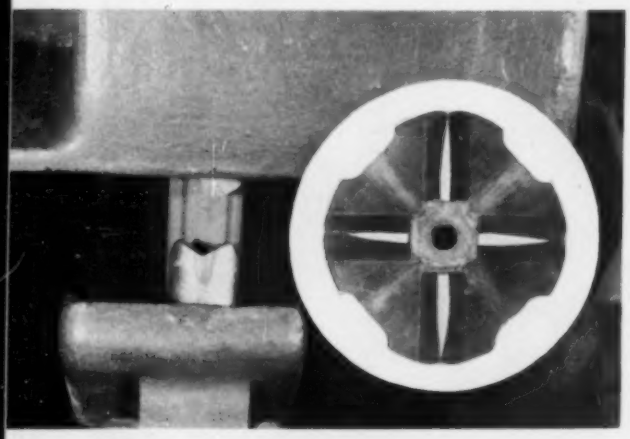


USE WHEELS OF PROPER WIDTH. Use manufacturer's recommended wheel hardness and width. Wheels that are too hard grind slowly and cause excessive heat



WHEELS THAT ARE TOO WIDE grind off bit corners and become concave as shown here

A WHEEL THAT IS CORRECTLY DRESSED at proper intervals will maintain proper cutting angles and do a better grinding job. I-R recommends a 100-deg. wheel angle

Here's the right way to regrind carbide bits

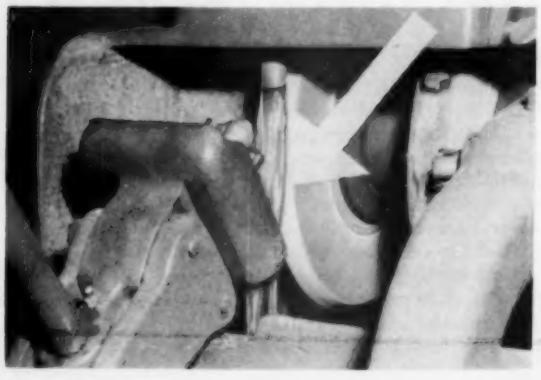
by R. Zimmerman*

A DRILL IS ONLY AS GOOD as its bit. If you want to drill holes fast, you must keep your carbide insert bits at peak efficiency with periodic regrinding. Proper regrinding prolongs bit life and saves wear on drill steels and other drilling equipment. Ingersoll-Rand Co., which manufactures Carset bits, suggests these steps for a good, quick grinding job.

Please turn to page 150

Engineer, Drill Div., Ingersoll-Rand Co.

A FULL FLOW OF WATER protects the bit by keeping it cool. It increases grinding efficiency and keeps the carbides from cracking



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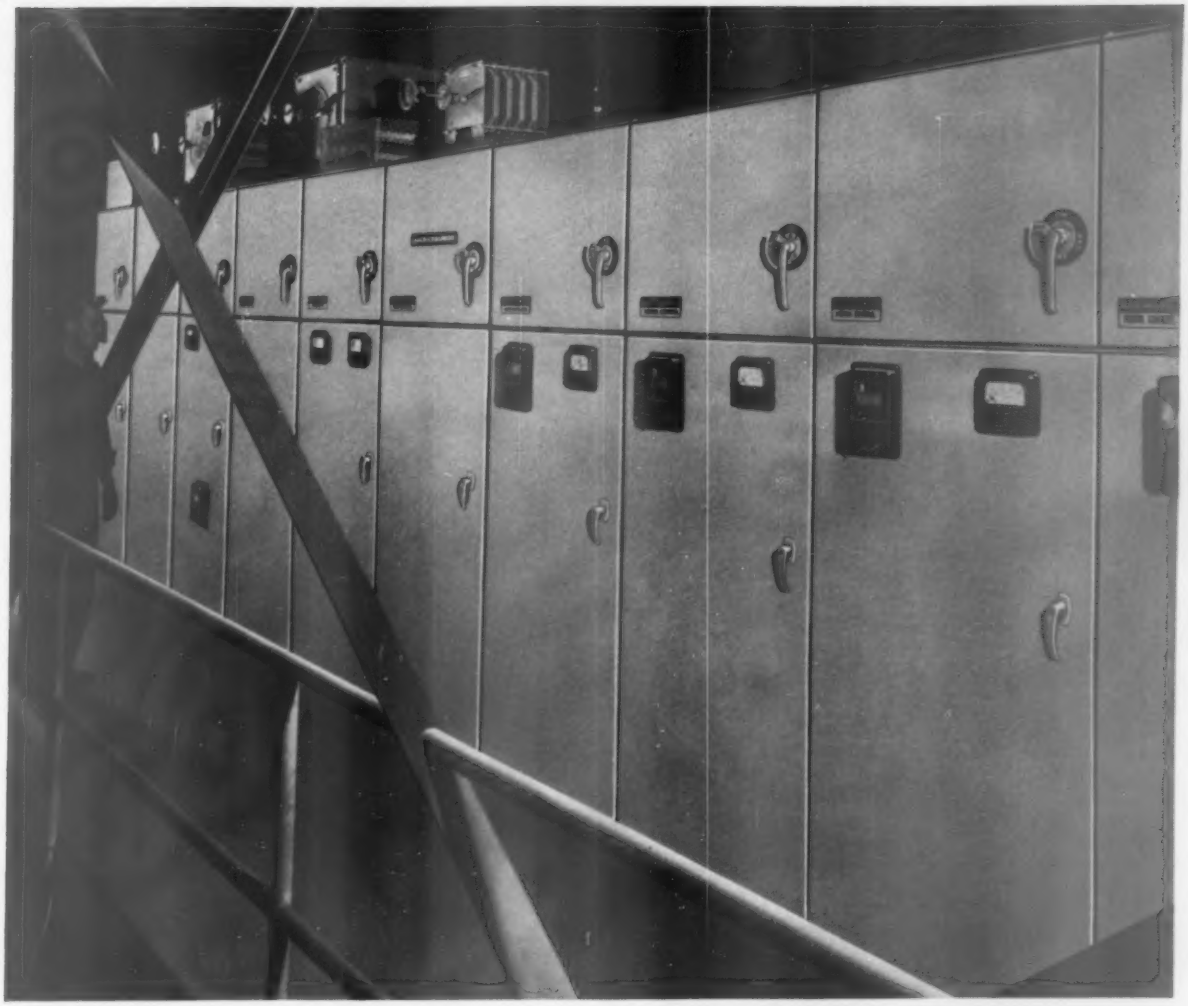

Processing plant control installation, designed by Allis-Chalmers, provides coordinated high voltage control of conveyors, ball mills, rod mills, crushers, pumps, and fans.

Get the hidden extra

that means motor control matched to your processing system

Allis-Chalmers is the only control manufacturer that also makes motors and heavy processing machinery such as grinding mills, crushers and screens. This intimate knowledge of motors and driven equipment is important to you. This is an extra benefit that assures you of control fully coordinated with other system components. It means fewer installation and engineering headaches . . . better overall plant performance.

Allis-Chalmers offers a complete line of low and high voltage control for all your synchronous, wound-rotor and squirrel-cage motors. Featuring heavy-duty, rollout air-break contactors for easy accessibility and maintenance, they take in stride the severe duty of repetitive starting, reversing, plugging and inching.

You get high interrupting capacity in small space. Current-limiting fuses reduce mechanical and thermal stresses on the entire system, and short circuits are cleared in less than ½ cycle. For synchronous motors, complete field protection is provided at the proper time in the cycle by automatic polarized field-frequency, field-application relay.

For more information, call your nearby A-C sales office. Or write ***Allis-Chalmers,*** *Industrial Equipment Division, Milwaukee 1, Wisconsin.*

A-1288

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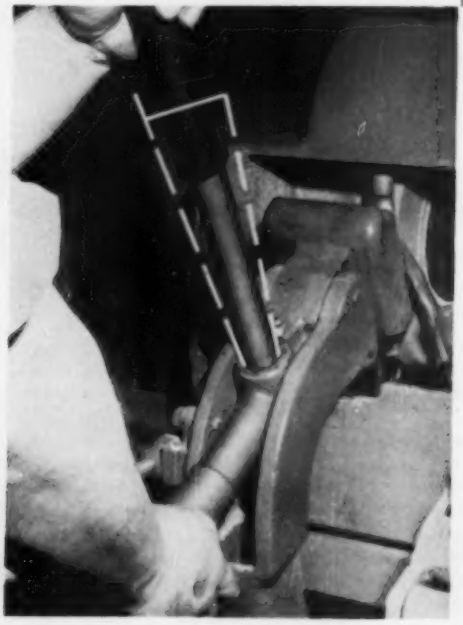
HERE'S THE RIGHT WAY TO REGRIND CARBIDE BITS

continued from page 148

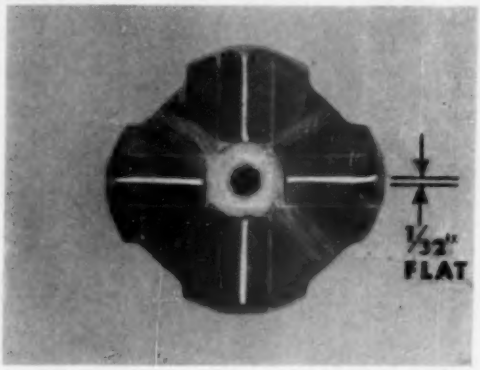
KEEP FORMING HEAD ANGLE ADJUSTED. Maintain correct bit angle by adjusting forming head angle as needed

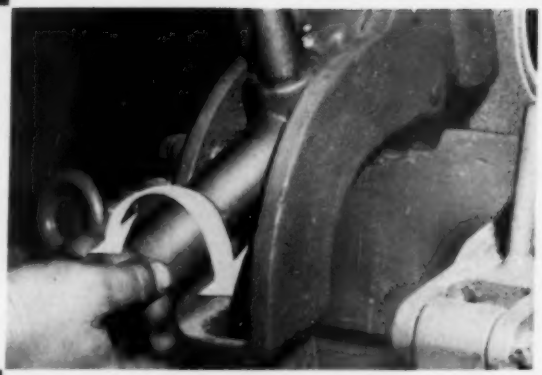
RIGHT: Oscillate bits when grinding. Rotate bits back and forth through a small arc while grinding the cutting edges. This improves grinding action

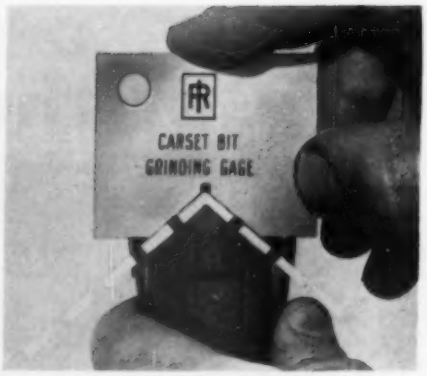
USE LIGHT INTERMITTENT PRESSURE. Heavy pressure wastes wheels and damages bits. Use hand pressure only



LEAVE 1/32 IN. FLAT ON CUTTING EDGE. Correct cutting edge has 1/32 in. flat all the way out to the gauge diam. If oversharpened, flatten cutting edge to 1/32 in. on the side of grinding wheel





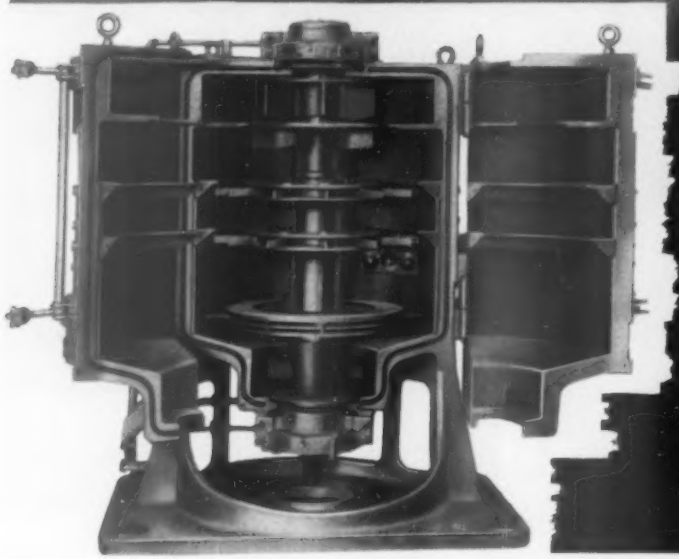


USE GAUGE FOR CORRECT ANGLE. Use manufacturer's gauge to check the cutting angle. Check out to the gauge diameter

Please turn to page 152

RAYMOND VERTICAL MILL

Designed for Hi-Fineness Grinding



HEAVY ROTOR SHAFT CARRIES FAN, HAMMERS AND WHIZZERS

WIDE HINGED DOORS FOR EASY ACCESS

WHIZZER AIR SEPARATION PRECISION CONSTRUCTION

SIMPLIFIED DESIGN WITH NO CLOSE CLEARANCES

QUICK SET-UPS AND EASY ADJUSTMENTS

Here is a modern mill so efficiently designed for its purpose that it is establishing records in the economical production of extremely fine materials in the sub-sieve particle sizes.

The prime features of the Raymond Vertical Mill are simplicity and accessibility. It permits quick set-ups to minimize down-time—easy cleaning and adjustments facilitate changes from one product to another—simplified control and automatic operation save production time.

This unit has wide application to a great variety of chemicals, pigments, synthetic resins, phosphate materials and many special products. It is serving modern industry in making solid rocket propellants, and it does an excellent job in pulverizing ammonium nitrate and ammonium perchlorate oxidizers.

The Vertical Mill gives good results in grinding non-abrasive materials to high fineness ranging from minus 325 mesh into the sub-sieve sizes. On some softer materials, reductions to 95% to 98% finer than 5 to 10 microns are readily obtainable with this mill. *If you have a hi-fineness grinding problem, write us for detailed information.*

Raymond Bulletin No. 78 gives full details of superfine grinding operations. Write for your copy.

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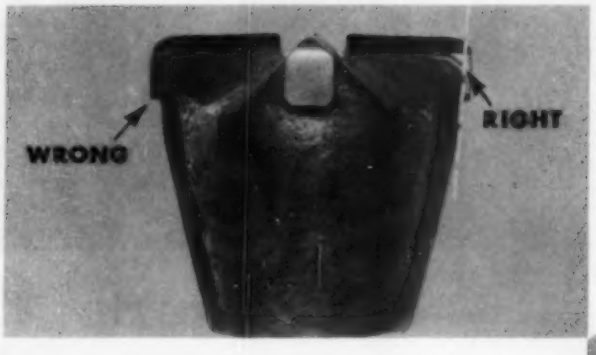
HERE'S THE RIGHT WAY TO REGRIND CARBIDE BITS

continued from page 150

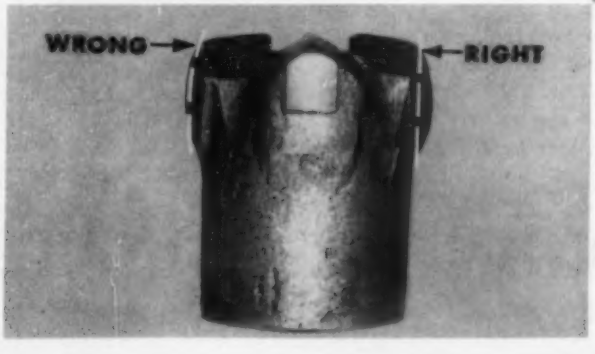
CORRECTLY REGROUND carbide bit looks practically like a new one. Note bevelled edge



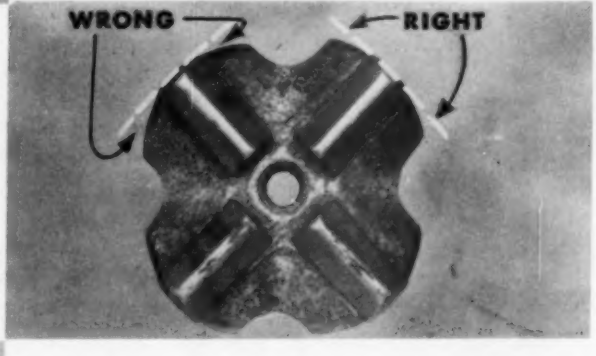
GRIND GAUGE ON "BARREL SHAPED" BITS. If a bit gets worn to reverse taper or "barrel shape," regrind the gauge surface to original angle (3 deg.)

RIGHT: When wing corners wear, grind the gauge to restore a reasonable portion of the original gauge surface. See that the wheel does not grind off more from the steel corners than from the carbide

GRIND GAUGE WHEN INSERTS PROTRUDE. When the steel wings wear away from around the insert, grind the gauge surface of the inserts so that they do not protrude



DRILL CENTER HOLE WHEN CLOSED. If center hole becomes pounded partly shut, reopen with a drill. Drill it clean from the inside of the bit



WHEEL RECOMMENDATIONS:

Bit Size	Wheel Width V Face
1¼"-1½"	¾"
1½"-2"	1"
2⅛"-2½"	1¼"
2½"-3"	1½"
3"-3½"	1¾"

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ONE D7 "BUYS" ANOTHER!

Just as sure as if the tractor signed the order, a D7's record bought this new tractor for Tyrone Rock Products Company of Atlanta, Ga. "Past performance of our D7s is the reason we selected another one for our new Yatesville plant," said General Superintendent John Hale.

Along with high power, reliability is built in the D7 Series D Tractors to meet 20-hour days and high production of plants like these. And D7s are famous for working around the clock, day after day when the job demands.

The Turbocharged Caterpillar D339 Engine develops 140 HP at the flywheel, 112 HP at the drawbar, with high lugging ability. The D7 also features a new dry-type air cleaner, lifetime lubricated rollers, stronger final drive gears, and optional in-seat starting. These new features, along with the field-proved oil clutch which delivers as many as 2000 hours without adjustment, keep users sold on the D7's low maintenance cost.

For a practical demonstration of what these machines can do, call your Caterpillar Dealer. His reliable parts stock and service facilities stand behind your investment.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

Another D7 of Tyrone Rock Products Company clears land for the new Yatesville plant. After helping to clear the 35-acre site, this D7 will be used for stockpiling operations of the 300-tons-an-hour production.

CATERPILLAR

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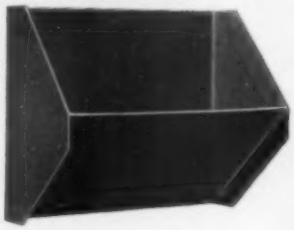
STEP UP PRODUCTION WITH A NEW D7

TOUGH
CONVEYING and ELEVATING CONDITIONS ?

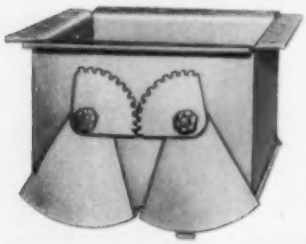
STANDARD METAL'S users lick TOUGH problems Every Day!

STANDARD METAL'S CONTINUOUS ELEVATOR BUCKET STYLE No. 2

This long-life bucket resists wear —delivers outstanding service and economy under severest conditions. This style is just one of the complete line of low-cost, rugged steel buckets manufactured by Standard Metal. Available in Salem, Style "A" and other continuous style buckets.



STANDARD METAL'S BIN GATES

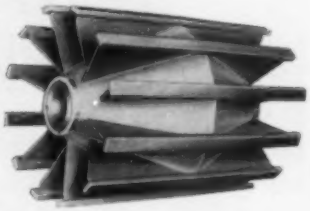


Here's the all-steel, gear-operated Duplex Bin Gate for faster, easier material handling at minimum cost. Now supplied standard with twin bracket at bottom of gate, drilled to accommodate bolt for fulcrum lever.

Single Bin Gates by Standard Metal also available.

STANDARD METAL'S WING-TYPE SELF-CLEANING PULLEY

Includes Taper-Lock Split Bushing to save time and trouble when mounting shaft. These pulleys are light in weight, yet their all-steel welded construction resists breaking, and delivers many years of trouble-free, low-cost service. Also available with solid hubs bored to specifications.



Contact us for full details and quotations on your particular needs in elevating and conveying equipment—for new installations or replacements. Ask for the catalog showing the complete Standard line.

The Standard Metal Mfg. Co. SINCE 1921

STANDARD METAL MFG. CO.
111 CENTER ST. MALINTA, OHIO

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continued from page 20

to all shrinkage, swelling and other ills of such structures. As to workmanship, Mr. Boynton gives these facts: "Three-coat work is usually employed, always at least two; great care is used to soak with water the back-up or each coat before the succeeding coat is applied." A third and potent reason for the satisfactory stucco is that the lime mortar mix is gauged with 25 to 50 percent by volume of portland cement. In the days before portland cement they probably used a pozzolan, or an hydraulic lime or cement, both in this country and in Germany.

According to Mr. Boynton, about the same mortar mix is used for interior plaster in Germany. More than that, their interior plaster is placed directly on the interior masonry walls, without furring or lathing. This practice certainly saves cost, time and space and, according to our reporter, appears to give satisfactory service, although considered very bad practice in the U.S.A. We know of one locality in this country where lime plaster gauged with portland cement was long used in dwellings. So far as we know it is still used there; that is, in Seattle, Wash., and Puget Sound country generally. It may be especially desirable in climates subject to long spells of damp weather. We can conceive that a gypsum plaster under such conditions may be unsatisfactory.

Mr. Boynton rather infers that the ability of the German lime industry to retain its plaster business is because the gypsum industry there has not given the same vigorous competition it has in the U.S.A. That may be part of the reason, but we can also fall back on the lack of application of good workmanship in this country, and the unholy desire for speed. There are many excellent examples of lime plaster in America of 50 or more years ago. There are other reasons for loss of the lime plaster business here. One is the rigid pride of lime manufacturers of 50 and more years ago in their product, and their stubborn refusal to "adulterate" it with portland cement or gypsum, conceived to be the lime industry's two arch enemies.

We well remember a research project of the industry, some 40 years ago, to find a way to make a "quick-hardening" or "self-hardening" lime plaster. We have no idea what it cost in either time or effort, but we do remember the good research chemist, who was in charge, telling us confidentially that the answer was obvious—gauge the lime mortar with gypsum plaster; but he dare not tell the lime manufacturers, who were willing to search

Please turn to page 159

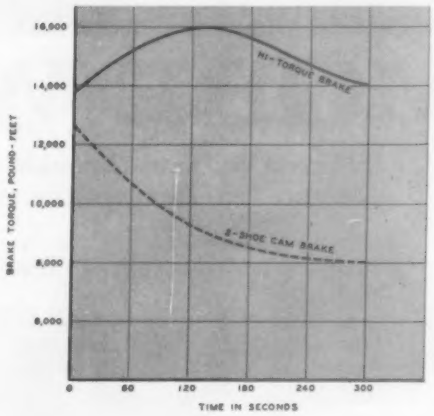
Full contact braking surface stops your vehicles twice as fast

Today's heavyweight vehicles need braking power to suit—and you get it with B.F.Goodrich Hi-Torque brakes. With these brakes, each of the shoes is forced by hydraulic power against the inside of the brake drum to provide *full-circle* braking action. Here are the advantages:

- Stopping distance cut approximately in half compared to conventional two-shoe brakes tested on identical vehicles and loads.
- Increased safety and controllability of the vehicle, permitting faster, more profitable use by the operator... shorter work cycles.
- Brake torque is maintained with minimum "fading" because of the non-energized design.

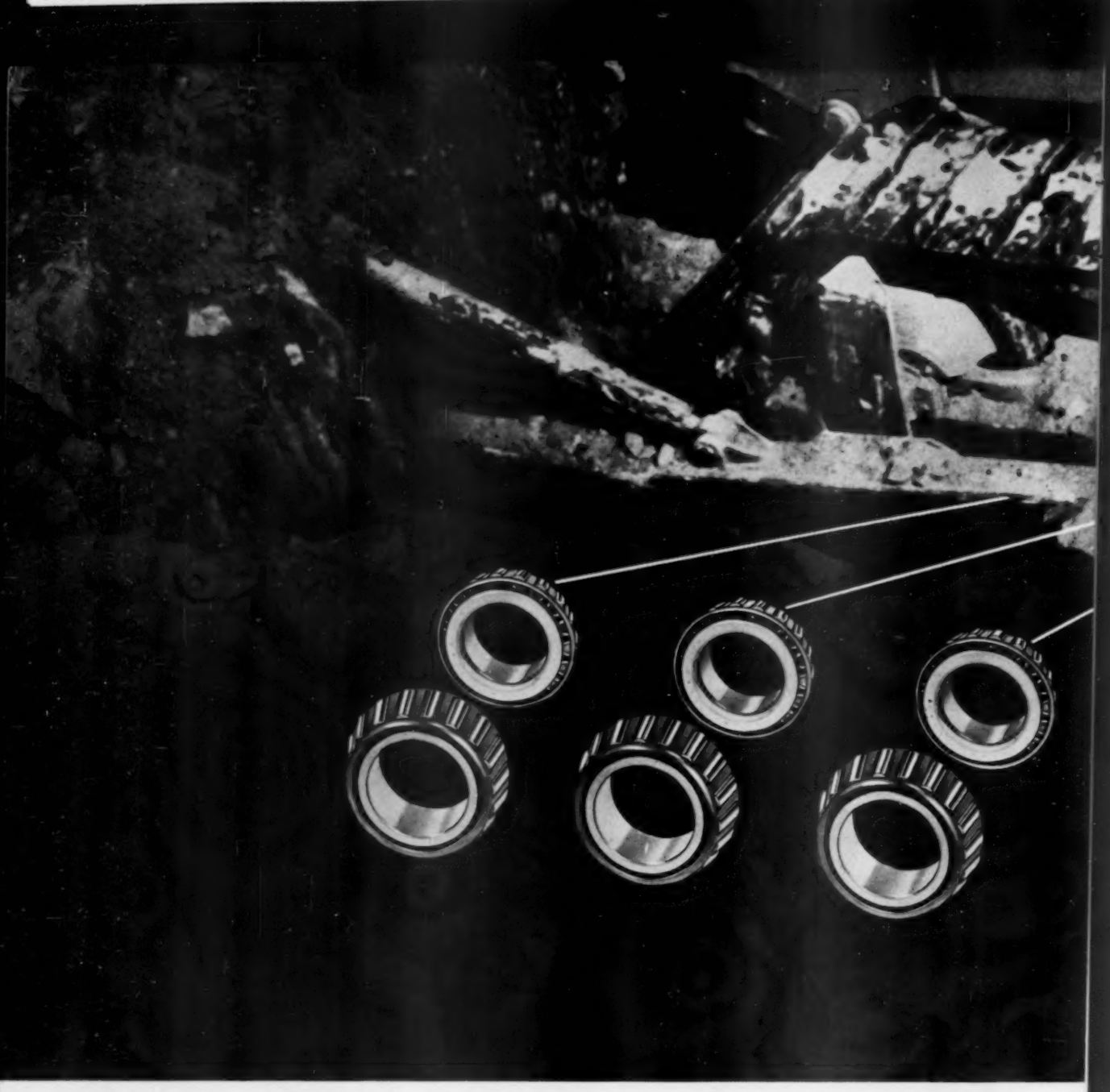
Hi-Torque brakes adjust themselves automatically, need no lubrication. Available in sizes from 17¼″ x 4″ to 26″ x 7″. For complete information ask your equipment manufacturer, or write B.F.Goodrich Aviation Products, a division of *The B.F.Goodrich Company, Dept. RP-4, Troy, Ohio.*

DOUBLE THE TORQUE—Dynamometer test made at constant speed 53 rpm, constant pressure conditions, brakes applied on 15-second cycles. Test duplicates operating conditions of heavy vehicle on long downgrade.



B.F.Goodrich Hi-Torque brakes

Enter 1459 on Reader Card



MORE WORK POWER

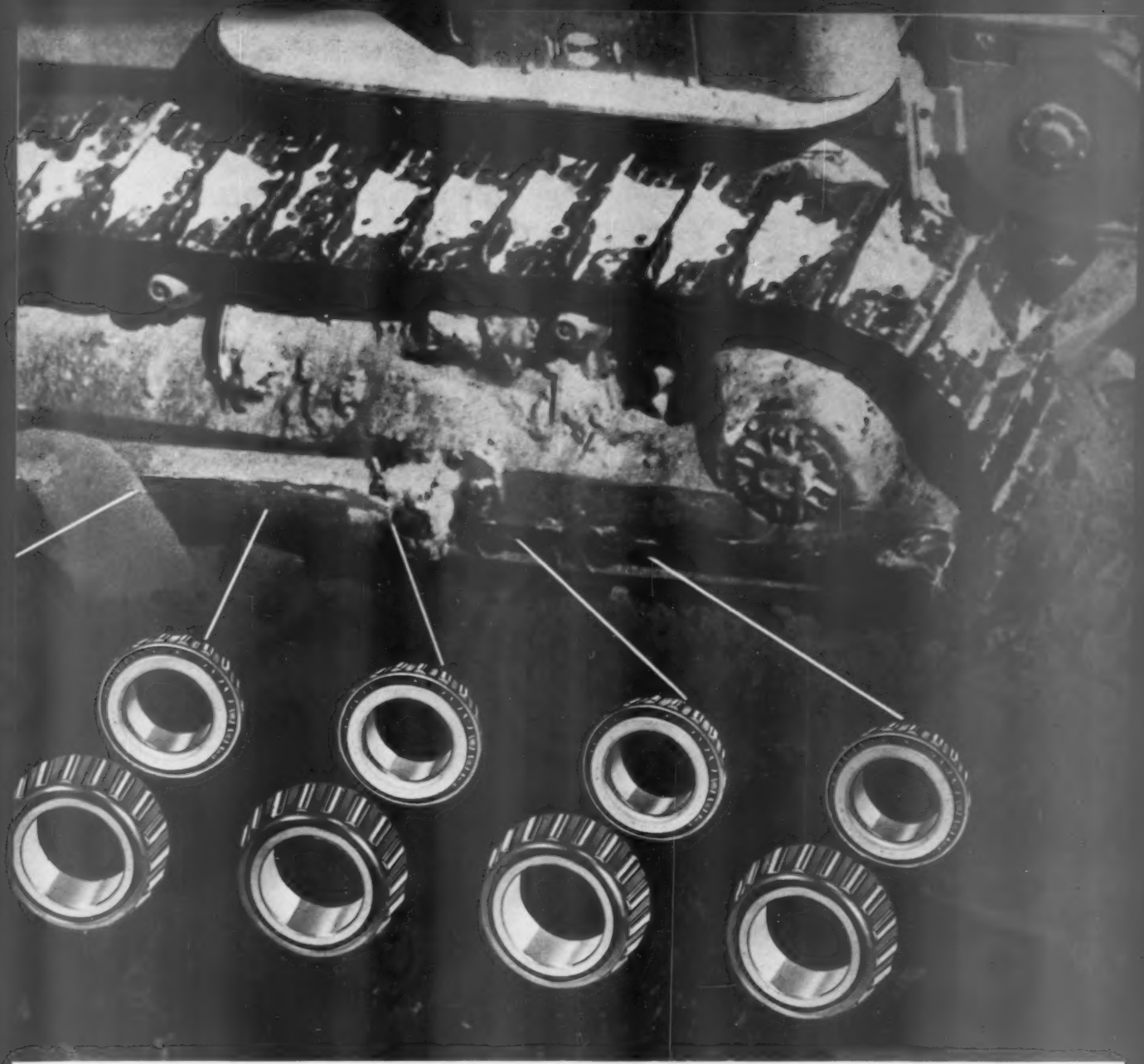
Reduced friction through use of tapered roller bearings in all Allis-Chalmers crawler tractors makes the difference in work power and profit for you!

All Allis-Chalmers crawler tractors roll on tapered roller bearing truck wheels. Most others still use bushings.

Anyone who remembers his roller skating days knows the performance advantages of bearings over bushings. The difference between first and also-ran was in the wheel bearing. This friction-reducing advantage is the reason railroads all over the country have turned to *roller* freight.

The same principle applies to tractors except much more power is being wasted by friction-type plain bushings. It's one of the reasons the 225-hp HD-21, on tapered roller bearings, produces right alongside the biggest tractors you can buy. Can you

move ahead with



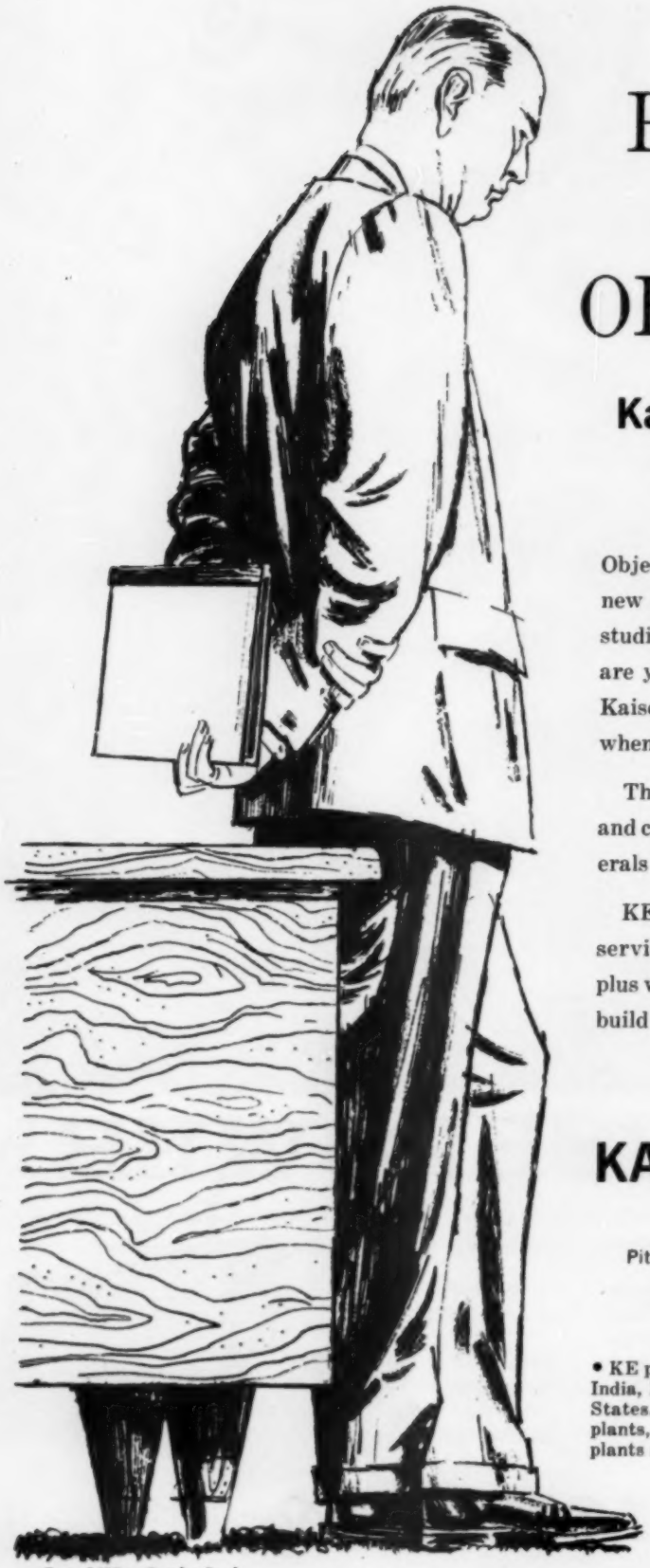
PER HORSEPOWER

continue to pay for power that *never* produces—that gets "lost" in old-fashioned bushings?

Your Allis-Chalmers dealer will be glad to discuss this and the many other advantages that keep the HD-21 on the go shift after shift with a minimum of maintenance. Ask about the *toughest track ever built* . . . the *industry's healthiest engine* and *certified permanent lubrication*. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wis.

ALLIS-CHALMERS

power for a growing world



PROCEED, DEFER OR MODIFY?

Kaiser Engineers can help you decide

Objective analysis is vital to sound decision on new plant or expansion projects. Feasibility studies, economic analyses and site evaluations are yours by an outside, impartial firm when Kaiser Engineers is selected to help you decide when, how and where to proceed.

These services are in addition to the design and construction of major facilities for the Minerals industry.

KE offers complete, one-company, integrated service from concept through construction—plus world-wide experience and the ingenuity to build quickly, within budget.

KAISER ENGINEERS

Division of Henry J. Kaiser Company
Oakland 12, California
Pittsburgh, Washington, D. C., Chicago, New York

• KE projects include work in Australia, Brazil, Ghana, India, New Zealand, as well as Canada and the United States. Assignments include iron ore concentrating plants, cement plants, bauxite and alumina processing plants and diatomaceous earth facilities.

5458-M

Enter 1417 on Reader Card

for any other chemical or material rather than accept the horrid truth. Presumably, the lime manufacturers of that day felt the same way about gauging their lime mortar mix with portland cement.

However, the portland cement manufacturers had no compunctions about buying hydrated lime to mix with their portland cement to make a mortar cement. Subsequently, they discovered that finely ground limestone would serve their purpose about as well—and lime for mortar all but passed out of the picture. There is a good chance that some can be recovered by lime-pozzolan mixtures, which have the good qualities of both lime and portland cement mortars. In the meantime lime manufacturers endeavor to get builders to use 10 percent or more lime in their cement mortar mixes.

Elsewhere in the report of his visit to France, we learn, with regret, that the ancient and honorable French hydraulic lime industry is passing out of the picture. We were long accustomed to pointing it out as proof of the virtues of hydraulic lime. It seems the former lime plants have been taken over by portland cement manufacturers who are adopting the American practice of making a mortar cement by mixing portland cement and ground limestone.

Thanks to a well-financed and aggressive promotion, sand-lime brick and block are still much used in Germany. According to Mr. Boynton, this is true of other European countries and Russia, as well as England. There is no doubt that as good a brick or block can be made of a sand-lime mixture as any clay or concrete. A quarter of a century ago sand-lime brick were making good but rather slow progress in this country. It was apparent, from the start of the process imported from Germany some 50 years ago, that to consistently get a satisfactory product required technical knowledge and skill. Unfortunately the promoters were not insistent on this point, and many went into the business unprepared. The result was that most have dropped out of production or have converted to autoclave concrete products which, apparently, are more fool-proof. Because of the variety in quality, sand-lime brick were generally looked upon by architects with considerable skepticism. We hope production will return in this country, because well-made sand-lime brick are as fine a building material, in beauty and permanence, as any competitive material. END

STARSTEEL
HEAVY DUTY SPACE SCREENS

This is why STARSTEEL screens top others in resistance to abrasion, fatigue, distortion—in some cases, last twice as long:

1 Specially alloyed high carbon wire is harder, tougher, more ductile

2 Tighter, more rigid weaving eliminates buckles and bulges

3 Perfectly formed edges and precision-applied hook strips make installation easier under higher tension, preserve accuracy of openings, reduce breakage

Insist on STARSTEEL screens—cut replacement cost and downtime, increase output. *Ask for catalog.*

QUICK SHIPMENT of all popular weaves, meshes, gauges

Star will produce screens or cloth from stainless or other steel alloys, Monel, brass, bronze, copper, aluminum or any metal that can be drawn into wire. Inquiries invited.

STAR WIRE SCREEN & IRON WORKS, INC.
2515 San Fernando Road • Los Angeles 65, Calif.

Subsidiary of Ludlow-Saylor Wire Cloth Company, St. Louis, Mo.

Enter 1450 on Reader Card

NEW LITERATURE

FOR FREE INFORMATION on these items, simply fill out and mail the postage-paid Reader Service Card found elsewhere in this issue

"Who Gets Hurt?"

THE NATIONAL SAFETY COUNCIL has published a pamphlet which explains the type of worker most likely to be accident-prone, how workers and their families are hurt in accidents, where accidents happen, what injuries cost the worker and his family, and what you can do about accidents.

The pamphlet uses a humorous approach, multicolored cartoons and concise text to discuss on-the-job injuries of workers.

Enter 700 on Reader Card

Annunciator systems

CEMENT, LIME, GYPSUM and other process industries will be happy to learn that Panellit, Inc. has released a 51-page booklet on annunciator systems. This device calls the attention of the operator to any off-normal conditions which occur in the system. Indication of off-normal conditions is both visual and audible. This is accomplished by energizing the annunciator system circuit through the closing or opening of any type of remote switch or contact. The actuating switch may be a thermostat, float switch, pressure switch, relay or any device that will make or break an electrical circuit.

Enter 701 on Reader Card

Electrodes pocket guide

NEW PRODUCTS and new engineering data have been added to the most recent edition of Air Reduction Sales Co.'s "Electrode Pocket Guide."

This 64-page booklet contains complete information on all types of electrodes available. A brief description is given together with applications, procedures and pertinent data.

Enter 702 on Reader Card

Hose fittings

LENZ CO. has published a two-color illustrated catalog of hose fittings and hoses. Pictured and detailed with specification tables are reusable hose fittings, assemblies, adapters and single and double wire braid hose.

Enter 703 on Reader Card

Generating plants

D. W. ONAN & SONS, INC. has just announced a special folder listing their entire line of gasoline engine-driven electric generating plants. The attractive 2-color, 4-page folder lists each series of plants (both air and water-cooled) in detail, with specifications for both engine, generator and controls outlined to make it comparatively simple for the reader to select the proper type of generating plant for his particular needs.

Enter 704 on Reader Card

Vibrating feeders

LINK-BELT CO. has an illustrated book, #2869, which describes their complete line of Motorized Counterweight vibrating feeders—more than 60 sizes.

Selection and application information is given on the company's feeders in all size ranges. Two pages are devoted to 15 illustrations of the many possible applications for MC vibrating feeders, and a chart shows the variations possible in cable suspension or floor mountings. Vibrating feeders with pre-designed hoppers and special modifications such as scalping decks and live-bottom hoppers are shown.

Enter 705 on Reader Card

Rotation percussion drill

A NEW DEVELOPMENT in percussion rock drills, the Joy 450-DR dual-rotation drill is described in a recently released brochure. Bulletin describes how this drill uses an integral air motor to provide hammerless rotation for steel changing and to assist rifle bar rotation in tight formations. Joy Mfg.

Enter 706 on Reader Card

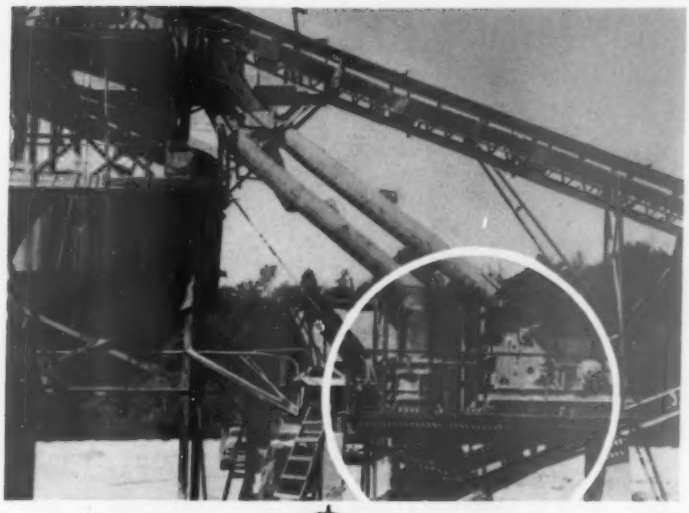
Complete equipment line

INTERNATIONAL HARVESTER CO. has issued a 24-page folder depicting, in brief form, the complete line of the company's construction equipment, which features crawler tractors, sidebooms and trucks.

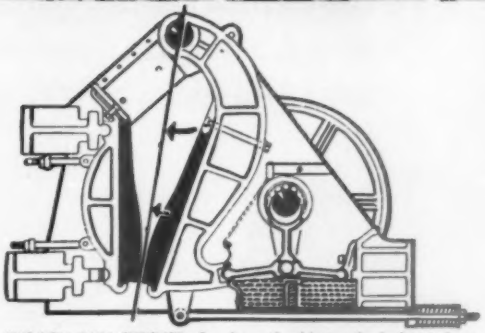
Enter 707 on Reader Card

(Continued on page 162)

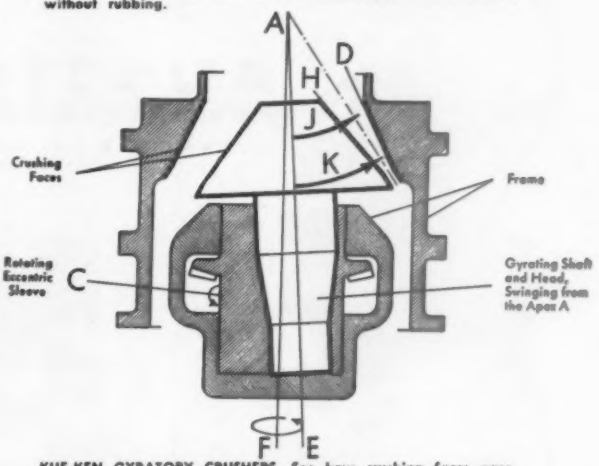
KUE-KEN® jaw plates and liners average full year of service on abrasive quartz by crushing without rubbing



5 times longer jaw plate life in over 6 years of continuous crushing of abrasive quartz has resulted in lowest cost-per-ton crushing for Joe Chevereaux in his Auburn, California, rock plant. With a plant capacity of 250 tph, the 6 x 16 KUE-KEN jaw crusher has operated continuously since 1953 with only six jaw plate replacements. The 28" KUE-KEN gyratory installed in 1958 and fed at a rate of 30 tons per hour has required only a single liner replacement to date. This profitable performance is attributable to the patented KUE-KEN crushing principle that eliminates rubbing—the main cause of premature jaw plate and liner wear. Additional savings result from lower power consumption: power is used to crush rock, not to wear out jaw plates. The KUE-KEN sealed, dust-tight lubrication system with all mechanism operating in filtered oil permits higher speeds for greater capacity and a more uniform product. Crusher wear is negligible and shut-downs common to conventional machines are practically eliminated. Automatic flywheel release prevents breakage from tramp iron. Especially for hard rock crushing, the lowest cost production is assured with KUE-KEN jaw and gyratory crushers.



KUE-KEN JAW CRUSHER. See how the hinge pin is located on the center line of the crushing zone. The jaw moves in an almost straight line. Rock is instantly gripped and crushed without rubbing.



KUE-KEN GYRATORY CRUSHERS. See how crushing faces pass through crushing zones on arcs J and K to crush rock squarely without rubbing.

Write for Catalog

KUE-KEN® CRUSHERS

"CRUSHING without Rubbing"

STRAUB MFG. CO., INC. 8387 Baldwin St., Oakland 21, Calif.

Jaw Crushers Gyratory Crushers Overhead Eccentric Crushers Revolving Screens Classifiers Feeders Rib Cone Ball Mills Concentrating Tables Vibrating Screens

Pennsylvania Crusher Division, Exclusive Licensed Eastern Manufacturer and Distributor, 323 S. Matlack St., West Chester, Penn.

Dealers:

SEATTLE, WASH. ..... **Washington Machinery Co.**
VANCOUVER, B. C. ..... **Universal Equipment Co.**
SALT LAKE CITY, UTAH ..... **Lund Machinery Co.**
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LOS ANGELES, CALIF. ..... **Garlinghouse, Fremon Co.**
SAN FRANCISCO, CALIF. ..... **Aggregate Engineers, Inc.**
BISMARCK, NORTH DAKOTA ..... **Midwest Equipment Co.**
PHOENIX, ARIZ. ..... **Road Machinery Co.**
BUTTE, MONTANA ..... **Hall-Perry Machinery Co.**
PORTLAND, OREGON ..... **Air-Mac, Inc. of Oregon**

Armstrong Whitworth (Metal Industries) Ltd., Authorized Licensed Manufacturer and Distributor. Close Works, Gateshead-upon-Tyne 8, England

Enter 1455 on Reader Card

Enter 1447 on Reader Card

NEW LITERATURE

(Continued from page 160)

Fluid bed dryer

COMBUSTION ENGINEERING, INC. has recognized the growing interest in new techniques and the potential inherent advantages of processing finely divided solids, and has released a bulletin describing their fluid bed dryer. It describes this entirely new process including design, operation and typical applications.

Enter 708 on Reader Card

"Jetslingers"

A 6-PAGE FOLDER describes the three types of Link-Belt Co. Jetslingers. These are machines equipped with short, high-speed belt conveyors for hurling free-flowing bulk materials into areas inaccessible by other mechanical means. The folder describes and illustrates both the suspended, swiveling and wheel-mounted units which are used for hurling material into storage in warehouses, boxcars, holds of ships, bins or upon the ground. Dimensional data is also given.

Enter 709 on Reader Card

Crane excavator

AMERICAN HOIST & DERRICK CO. has released a catalog describing its new crane excavator. Featured are the crane, magnet, clamshell, dragline, shovel and backhoe.

Enter 710 on Reader Card

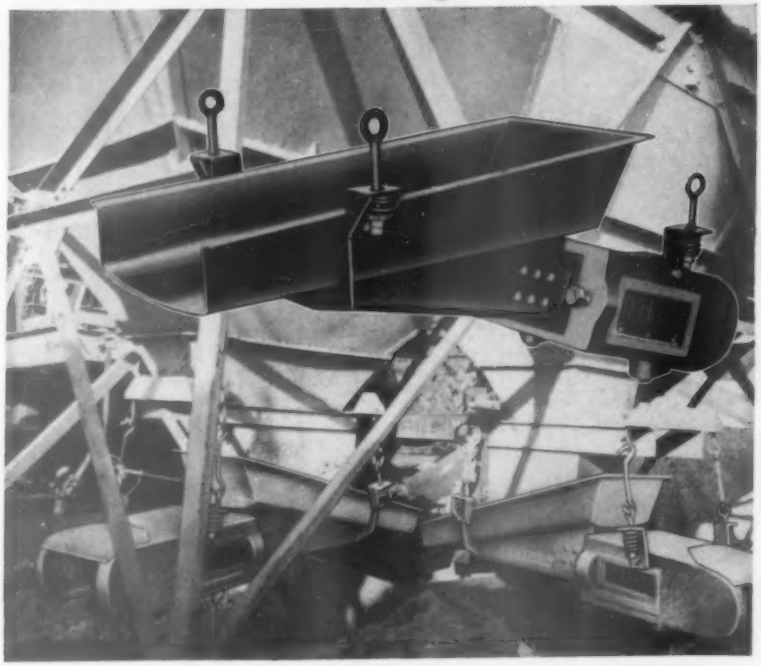
Dragline buckets

M. P. MCCAFFREY, INC. has released a brochure on its all-welded dragline buckets. The mediumweight and light-

(Continued on page 166)

SYNTRON cost-cutting equipment of proven dependable Quality

feed stone at high TPH rates



SYNTRON Vibra-Flow

VIBRATORY FEEDERS

* * * feed rock, aggregate, sand and other bulk materials at rates from pounds to thousands of tons per hour.

SYNTRON Vibratory Feeders give you these features for lower cost production:

—dependable flow feeding of bulk materials to conveyor belts, crushers, screens, etc.

—instant flow control, the power of vibration is instantly controllable for more efficient material flow.

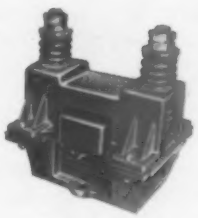
—durable and versatile, withstand heavy load shock and wear by abrasion. Compact, easily integrated into material handling operations.

—operation and maintenance economy—there are no mechanical wearing parts—no lubrication or periodic adjustments required.

Install SYNTRON Vibratory Feeders for the dependable, low cost handling of all your bulk materials.

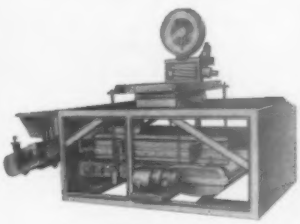
. . . write today for complete catalog data

Other SYNTRON Equipment of proven dependable Quality



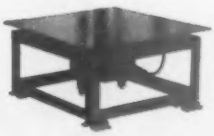
BIN VIBRATORS

VIBRATING SCREENS



GRAVIMETRIC FEEDERS

TEST SIEVE SHAKERS



VIBRATORY PACKERS

SYNTRON COMPANY

450 Lexington Ave. — Quality Equipment Since 1921 — Homer City, Penna.

Sales Offices in principal cities in the United States and Canada—Agents in most foreign countries

Enter 1497 on Reader Card

FOR RESULTS LIKE THIS ON YOUR NEXT SHOT...

WHICH

There's a lot of easy digging in this low-lying, well shot pile. A minimum of secondary blasting is needed, and there's no towering muck pile to come showering down on your men or equipment. Breakage and displacement like this gets every possible hour of service out of all your equipment.

Effective blasting control doesn't just happen. There is a combination of explosives and blasting methods that is right for every shot. For instance, if the conditions in your quarry lend themselves to the use of AN blasting agents, *new* Atlas Pellets are porous, compact particles that have higher density and sensitivity for more efficient blasting. On the other hand, for some rock formations, high explosives often do a better job—and more economically. In addition, all types of blasting caps, primers, and special packaging methods are available from Atlas . . . each designed for certain conditions and types of work.

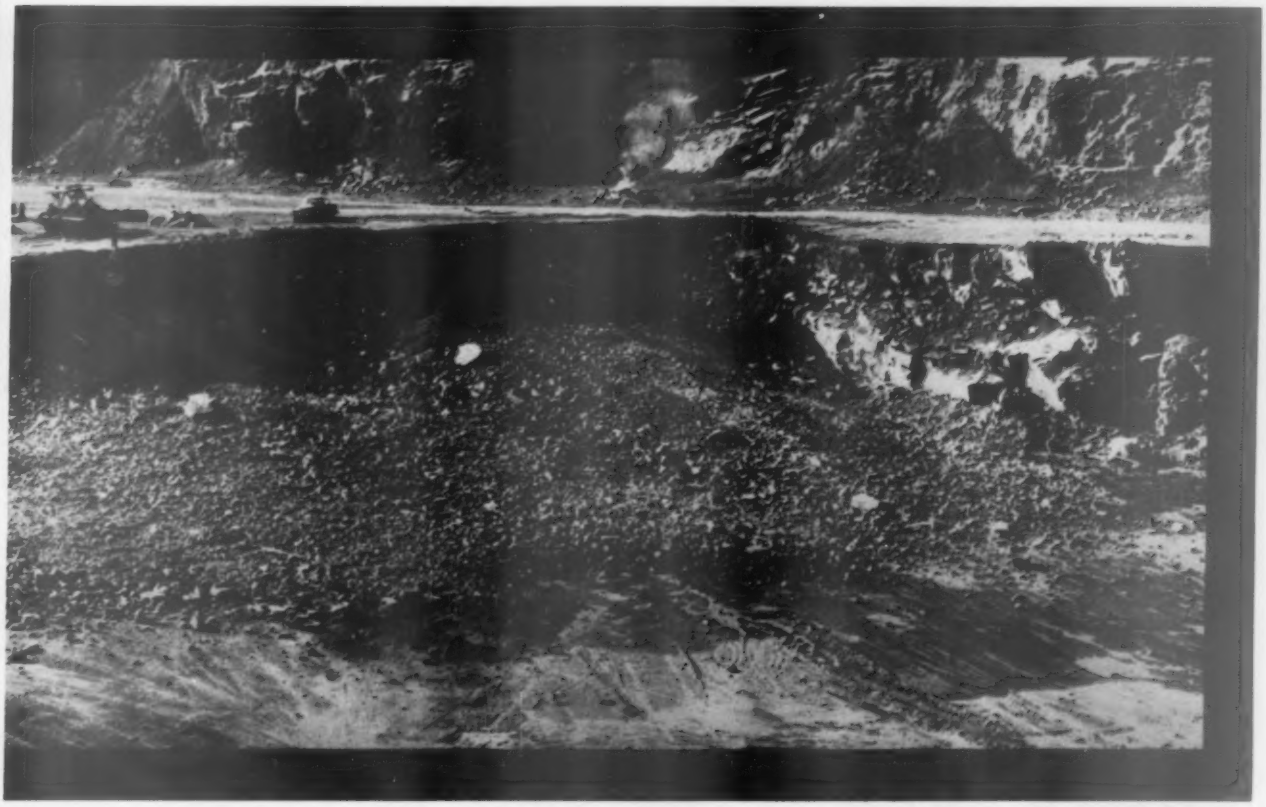
Which Explosive? That's the job of your Atlas Representative. Backed by the complete Atlas line (including all types of ammonium nitrate), his experience with the latest advances in explosives and techniques can help you find the explosives combination and the particular blasting methods that will be most profitable for you on every shot. Our blasting cost chart, slide rules and technical literature are designed to help you determine your lowest true blasting costs. Ask your Atlas Representative about them—or write directly to:

ATLAS POWDER COMPANY
Explosives Division, Wilmington 99, Del.

When you use the right combination,
all your equipment
moves in sooner...
works faster...
produces more.

ATLAS PELLETS, a new form of ammonium nitrate, are porous, compact particles that have both the density and sensitivity required for efficient ammonium nitrate blasting.

EXPLOSIVE?



GIANITE, a pre-mixed form of ammonium nitrate, provides the flexibility needed to use ammonium nitrate blasting agents where on-site mixing is difficult or impractical.

GIANT "75" PRIMERS have the wallop required for complete, efficient detonation of both field mixed and plant mixed AN blasting agents, even under severe conditions.

TWINPLEX BLASTING CAPS are two E. B. caps with the leg wires enclosed in a plastic sheath—for detonation at the bottom of deep blast holes, the point of maximum confinement.

ATLAS **ATLAS EXPLOSIVES**

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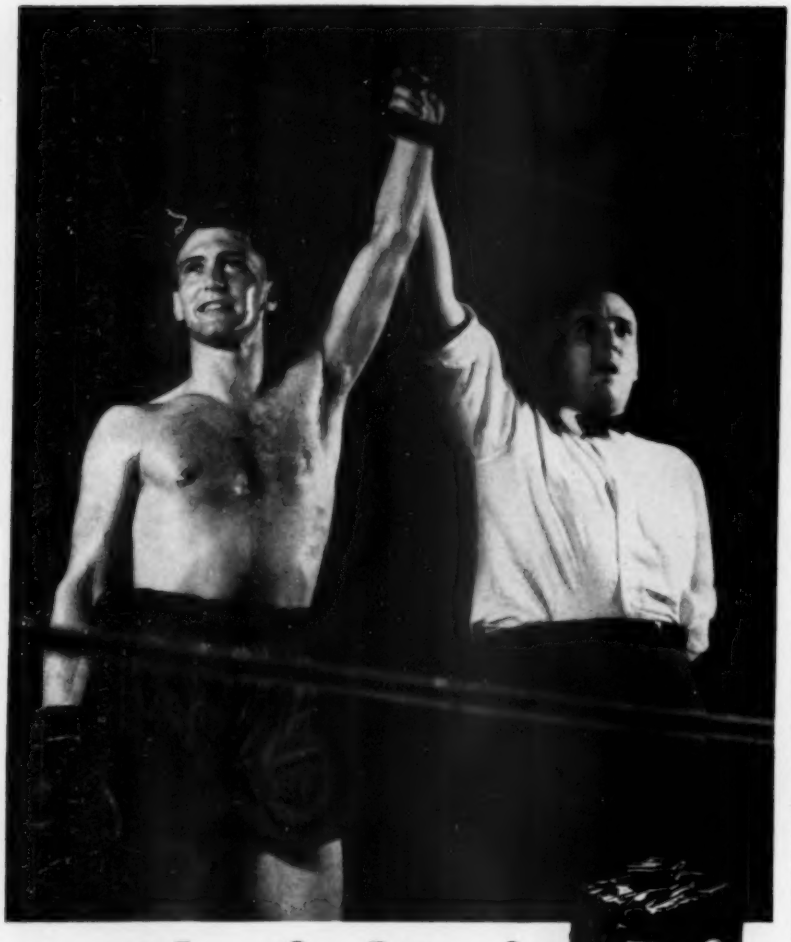
IT'S *the decision* THAT COUNTS



...with a fuel, too!

B&O bituminous merits your winning decision for sensible plant operating reasons. (1) Volume supply in wide variety is a sure bet to outlast current competitive fuels. (2) Sources are nearest to major consumption—always dependable. (3) Mining and burning developments continually tailor bituminous to greater efficiency. Bet on B&O Bituminous! ***Ask our man!***

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BALTIMORE 1, MD. Phone: LExington 9-0400

B&O B&O B&O B&O B&O

BALTIMORE & OHIO RAILROAD
BITUMINOUS COALS FOR EVERY PURPOSE

Enter 1448 on Reader Card

NEW LITERATURE

(Continued from page 162)

weight buckets are made in sizes up to 4½ cu. yd. Carefully planned balance of the buckets gives a better bite, easy control and quick, clean dumping, the firm reports.

Enter 711 on Reader Card

Control panel design

SOME IMPORTANT FACTS to be considered in designing an efficient control panel are discussed in a 4-page Fact File offered by the Fuller Co.

Strategic location, good electrical and mechanical practices, codes and standards to be kept in mind, enclosures of various types and safety precautions are covered under separate headings. Some common oversights in design are cited, as are tips on specifying a control panel.

Enter 712 on Reader Card

Bag packers

E. D. CODDINGTON MFG. CO. is distributing bulletins describing both its Auger-Matic and Air-Pac valve bag packers. Both save money for the producer by speeding bag packing, the bulletins state. One unit uses an auger to push the material into the valve bag, the other, the fluidizing air principle. Both units have automatic shut-offs which stop material flow when the bag has reached specified filled weight.

Enter 713 on Reader Card

Processing equipment

A TWO-COLOR illustrated brochure has just been released by Cindaco Inc. describing their services and equipment for the aggregate industry.

These services include research, engineering and design of complete processing plants for aggregates, concrete and asphalt. This organization is staffed to build and erect entire plants, and to specify and fabricate all required processing equipment.

Enter 714 on Reader Card

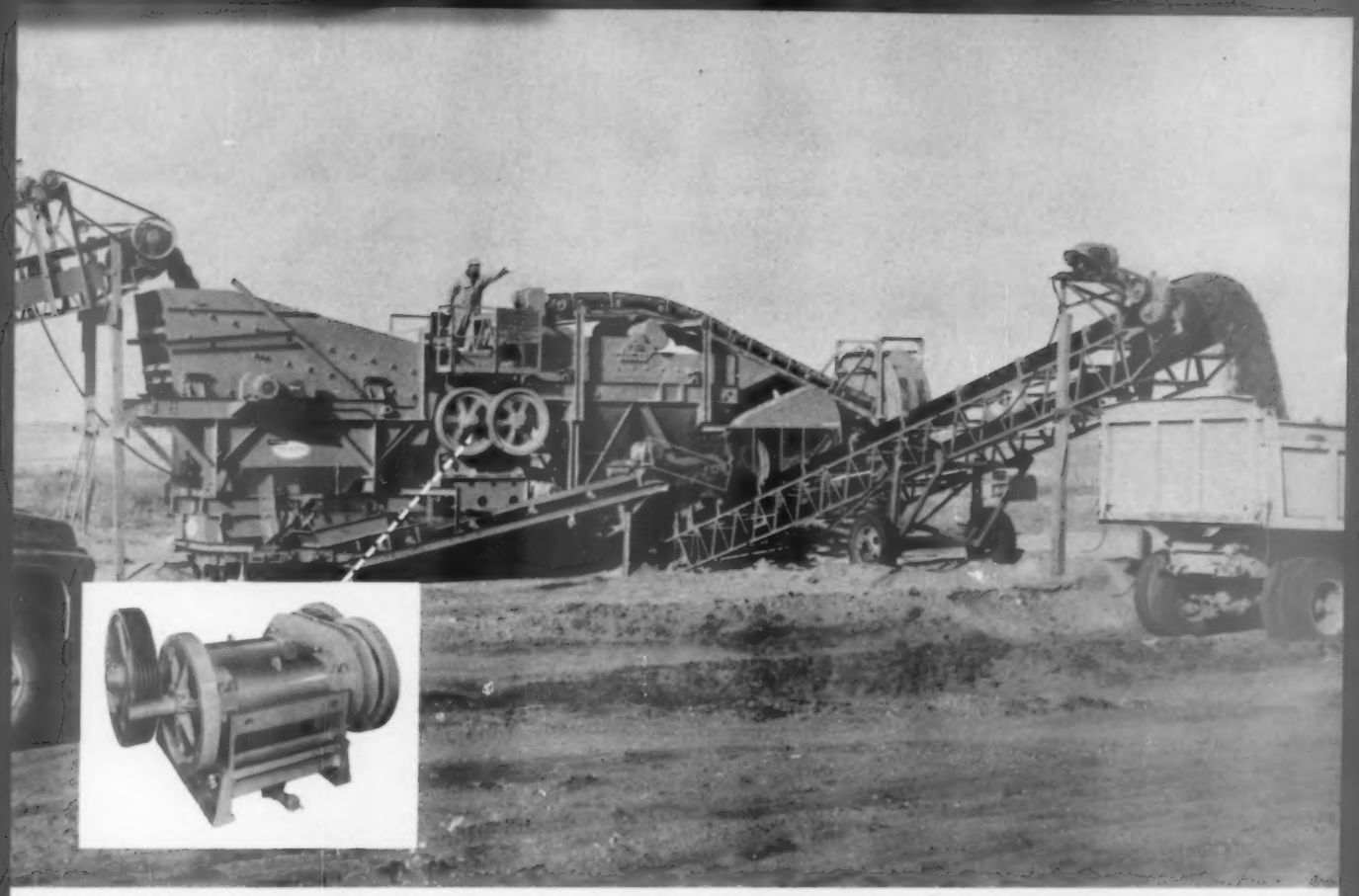
Rear dump truck

INTERNATIONAL HARVESTER CO. has a 16-page catalog available describing the features of the 19-ton Model 65 Payhauler.

The rock-ribbed corrugated body of this model has made possible a 5,000-

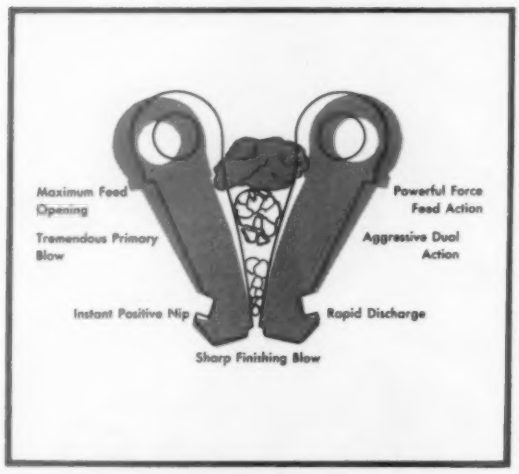
(Continued on page 172)

Enter 1449 on Reader Card



NEW MATCHED JAW CRUSHER BOOSTS PRIMARY CAPACITY IN UNIVERSAL GRAVELKING

Two moving, high speed jaws feed faster, crush faster, discharge faster!



Capacities in excess of 700 T.P.H. This is the kind of production being reported on the Universal Gravelking portable plant with its new Matched Jaw Crusher.

New Matched Jaw Crusher with its longer jaws gives positive nip without belching. The high speed velocity crushing of two moving jaws provides forced feed and forced discharge. As a result you get primary crushing capacities never before thought possible.

Reduces recirculating loads. The Matched Jaws' dual crushing action with its tremendous primary blow plus sharp finishing blow assures close to finished size crushing of discharged material. This reduces recirculating loads and takes the strain off secondary equipment.

Investigate this new Matched Jaw Crusher. It could prove to be just the primary you need to boost your overall plant capacity.

Portable plants with high capacity Matched Jaw Crushers are available in the new Universal Giant and Gravelking.

Ask your Universal distributor, or write:

PETTIBONE UNIVERSAL
In Cedar Rapids Since 1906

UNIVERSAL ENGINEERING CORPORATION

617 C Avenue N.W., Cedar Rapids, Iowa

Subsidiary of Pettibone Mulliken Corporation, 4700 W. Division Street, Chicago 51, Illinois

Always use tape to fasten the electric blasting cap (or fuse and cap) onto Primacord trunkline about six inches from end with the business end of the cap pointing in the direction of the blast.

FIVE PRIMACORD® CONNECTIONS

all tied for better blasting

Primacord is easy to use. Positive priming can be accomplished with simple connections, proved and recommended for the type and size of cartridge or "powder" in use. These can all be made at the hole. For positive hook-up, the downlines can be connected to the trunklines with simple half hitches drawn up *tight*.

1. **LOOP-LOCK HALF HITCH** is recommended when the downline cannot be tied easily. The loop-lock makes it impossible for the half hitch to slip off the end of the downline. Shown is Plastic Wire-Countered downline and Plain Primacord trunkline.
2. **DOUBLE HALF HITCH** is recommended when the downline is Reinforced (shown), Plain, or Lo-Temp® Primacord. It grips the trunkline, which in this case is Plain Primacord.
3. **SINGLE HALF HITCH IN TRUNKLINE** can be used when the downline is Plastic Reinforced (shown) or Plastic Wire-Countered. Place connection *at least a foot* from the end of the downline. Trunkline can be Plain (shown), Reinforced or Lo-Temp Primacord.
4. **PLASTIC CONNECTOR** is recommended when both downline (Plastic Wire-Countered) and trunkline (Plastic Reinforced) is of a type that does not tie securely.
5. **SQUARE KNOT** is recommended for trunkline connections when using Plain, Reinforced and Lo-Temp Primacord (shown).

Priming and hooking up with Primacord simplifies field work, reduces hazard, promotes economy and can give you the results you plan for.

P-1

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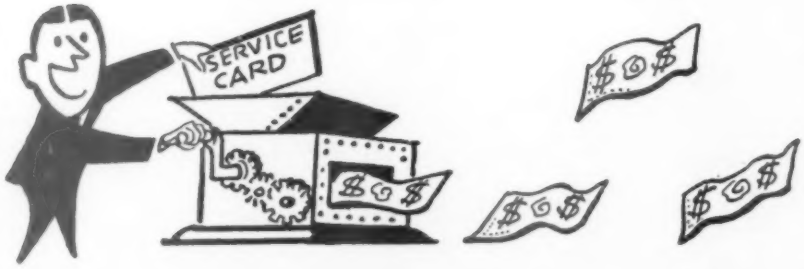

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Idler questions? H-R has the answers!

At last! A truly comprehensive book on belt conveyor idlers that answers *all* your questions. The new Hewitt-Robins "Belt Conveyor Idlers" book is one of the most complete ever offered to industry. In it you'll find:

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- Answers to questions frequently asked about idlers.
- Engineering information on belt speeds, conveyor capacities, idler spacing, and other factors you must consider in selecting idlers.
- Complete explanation of 14 basic types of idlers manufactured by H-R to fit every belt conveyor need.
- Tips on how to extend the life of idlers.

For your copy, consult your H-R representative, or write Hewitt-Robins, Stamford, Connecticut. Ask for Bulletin 4-19.

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NEW LITERATURE

(Continued from page 166)

lb. reduction in body weight through the use of strength-tripling steel panels. Power is furnished by a 6-cyl. diesel engine which develops 250 hp. in driving a 10-speed, constant-mesh transmission.

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Truck crane

AMERICAN HOIST & DERRICK CO. has available a 20-page catalog describing their 22½ ton truck crane. Actual on-the-job photographs, as well as illustrations and descriptions of its exclusive features and versatility, are included.

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Processing equipment

FULLER CO. lists and describes its major product lines in a 12-page, two-color bulletin. Included are applications and performance characteristics of pumps, pneumatic conveyors, fluidizing conveyors, rotary compressors, vacuum pumps and other processing equipment. Operating principles are explained and photographs show typical installations.

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Natural gas engines

THE COMPLETE LINE of Caterpillar Natural Gas Engines for all applications is described in an 8-page booklet by Caterpillar Tractor Co.

The booklet traces the development of the natural gas engine, shows model views, specifications and fuel consumption curves, and includes photographs and job stories illustrating actual performance of Cat Natural Gas Engines in drill rig, irrigation, gas compressor and gas separation.

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Crane and shovel

A 12-PAGE, 2-COLOR CATALOG has just been published by Unit Crane and Shovel Corp. covering the Unit Model 1020, series A. This is a ¾-yd. shovel, convertible to dragline and clamshell operations, as well as a crane with 12½ ton capacity.

Illustrated features include automatic traction brakes, massive carbody and roller patch gear, all welded turntable, three sets of twin hook rollers, smooth, disc-type clutches, powerful gear train assembly, full vision safety cab, and more.

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Heavy-duty chain data

ATLAS CHAIN & MFG. CO., subsidiary of Prudential Industries, has new technical data available on a new heavy-duty chain which has been developed for applications where the operating conditions are really severe.

Literature gives full details on the chain, drawings of its construction, as well as sizes available and sprockets to be used with it.

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Drip-proof motors

STERLING ELECTRIC MOTORS, INC. announces availability of a bulletin on the newly developed "Sterlicone Multi-Shielded" drip-proof motors.

The bulletin illustrates design features, and explains in detail how these motors can replace totally-enclosed motors in many applications where adverse conditions of moisture, humidity, dust, oil and chemicals prevail.

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GREATER EFFICIENCY—LESS MAINTENANCE ...working parts are located at discharge end of mixer, away from sifting fines of conveyor belt.

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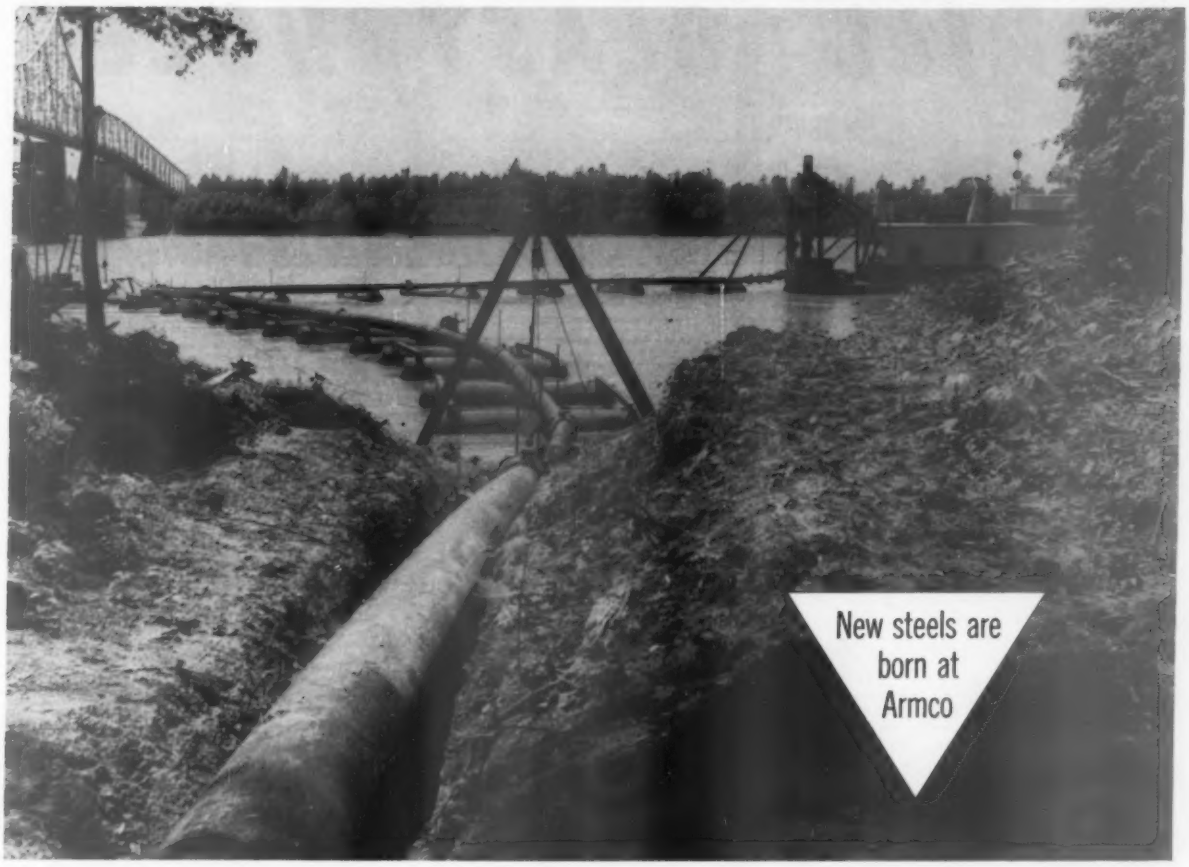

Armco Special Analysis Steel Pipe
Dredges 12,000 Gallons A Minute

Near Cairo, Illinois, it became necessary to widen two bridge approaches where the Mississippi and Ohio Rivers merge. Dirt for fill was considered too expensive, so it was decided to take sand from the Mississippi and use the sand as fill. Armco Special Analysis Steel Pipe was selected for the job.

Pouring out of the 18-inch Armco Pipe at 12,000 gallons a minute, the water-saturated sand was transformed into solid fill. After dredging, further compaction was not needed — the sand weighed 3500 to 3700 pounds to the cubic yard and the compaction ratio was 97%. The dredging contractor, Missouri Dredge Company, used 6000 feet of Armco Pipe for the job.

Armco Dredge Pipe is made of special steel developed by Armco to withstand abrasive materials and rough service. For complete details, write us for the free illustrated folder on Armco Special Analysis Steel Pipe. Armco Drainage & Metal Products, Inc., 4190 Curtis Street, Middletown, Ohio.

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BLASTHOLER drilling 25′ blast holes 3″ in diameter in limestone quarry. Production averages 1200′ per day.

BLASTHOLER

A self-propelled rotary drill, the BLASTHOLER is mounted on tracks or dual pneumatic tires — covers terrain like a bulldozer. The BLASTHOLER requires only one operator — carries its own air for cleaning blast hole. In limestone quarries meeting highway specifications, the average time for 20′ holes is 3 to 4 minutes. Many BLASTHOLERS have drilled more than a million feet within a 2-year period. Chances are the BLASTHOLER can improve your production record and save you money, too! *Contact your nearest dealer for a cost-cutting demonstration today!*

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NEW PATENTS

by OLIVER S. NORTH

RECENTLY ISSUED PATENTS ON NONMETALLIC MINERALS*

Lime

U.S. 2,920,922—In a method for forming a pumpable, high-solids lime slurry from dry, finely-divided **lime,** the dry material is continuously flowed into a turbulently flowing stream of water at the rate of 30-50 parts lime to 100 parts slurry produced. This slurry may then be transported conveniently in bulk from lime plant to user. (to L. J. Minnick and C. A. Danforth; assigned to G. & W. H. Corson, Inc.)

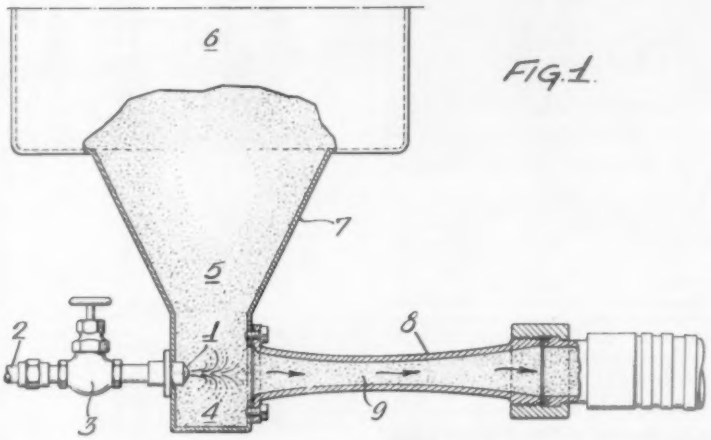

FIG. 1.

Diagram data of Patent No. 2,920,922 shows in side elevation the apparatus for efficiently slurrying dry lime. Water from conduit (2) intercepts lime (5) flowing from bin (6) in mixing chamber (4). Rapid and intimate mixing takes place in turbulent flow chamber (8). Part of the slurry may be recycled through conduit (2)

Asbestos

U.S. 2,916,908—An improved joint sealing compound for use between building brick or block comprises **asbestos** fiber, **talc, silica,** hydrated **lime** and aluminum stearate. This compound is permanently non-brittle and requires no water when used. (to J. L. Felder)

U.S. 2,917,426—Use of chrysotile **asbestos** fiber, glass fiber, **mineral wool** or the like in inorganic papers and textiles in which fibrous alumina monohydrate, or boehmite, is used as the binder. (to J. Bugosh; assigned to E. I. du Pont de Nemours & Co.)

U.S. 2,917,570—An electrical insulating sheet material consists of mica paper with **asbestos** fiber on one or both of the outer surfaces. (to G. M. Wolff and C. D. Richardson; assigned to General Electric Co.)

British 821,727—To separate **asbestos** fiber from rock and clean it, the ore is impacted for a short time at high velocity against a breaking surface. The mixture of broken ore and rock is then subjected to high-speed classification without using such strong air blasts as would create excessive agitation in the atmosphere. (to C. V. Smith)

Miscellaneous

U. S. 2,914,391—Method of forming a flowable slurry of solid particles in a vaporizable liquid prior to fluid energy grinding or other processing thereof. Among the nonmetallics cited are **talc, barite, oystershell, clay, gypsum, limestone** and **marble.** (to W. M. Stratford; assigned to Texaco, Inc.)

U. S. 2,915,179—Design for an aerodynamic classifier suitable for classifying pulverulent **talc, graphite, kaolin** and other types of clay, etc. (to H. G. Lykken; assigned to The Microcyclomat Co.)

U. S. 2,916,213—Method for entraining mineral mixtures, e.g. ores of **apatite, feldspar, fluorspar, kyanite, mica,** etc., in a vapor and subjecting the material to high-velocity turbulence so that disintegration is largely along mineral interfaces. The ore may then be separated into mineral-rich and mineral-poor fractions. (to P. L. Paull; assigned to Texaco Development Corp.)

Sylvinite

U. S. 2,916,274—Mining machine having an arcuate cutter feed and particularly adapted for operation under conditions encountered in beds of **sylvinite** or other ores of potash. (to R. G. Haworth, W. M. Fleming, F. J. Priesnitz and A. L. McLaughlin; assigned to Potash Co. of America)

U.S. 2,920,635—Apparatus and method for removing from a vessel at a controlled rate a heavy slurry in which solids tend to settle rapidly, e.g. particles of potassium chloride in a saturated KCl-NaCl solution such as is derived in the processing of **sylvinite** ore. (to W. P. Wilson; assigned to U.S. Borax & Chemical Corp.)

British 821,377—Process for countercurrent decantation leaching of **sylvinite** ore to recover potassium chloride from the sodium chloride gangue fraction. (assigned to Borax Consolidated Ltd. and U. S. Borax & Chemical Corp.)

(Continued on page 176)

*Copies of United States patents are available at a cost of 25 cents each (photostat copies of foreign patents at 30 cents per page) from The Commissioner of Patents, Washington 25, D.C. For convenience, coupons, each good for one copy of any patent, may be purchased from that official at the rate of $5.00 per 20-coupon pad or $25.00 per 100-coupon pad.

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—says J. O. ARCHIBALD
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The job was clearing 500 acres of salt marsh for crystallizing ponds. To quote, "We selected LUBRIPLATE No. 107 for track and general lubrication and LUBRIPLATE APG-140 for transmissions and final drives. During the entire job there was no replacements of track rollers nor any tie-ups of equipment due to parts replacement or breakage!"

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NEW PATENTS

(Continued from page 175)

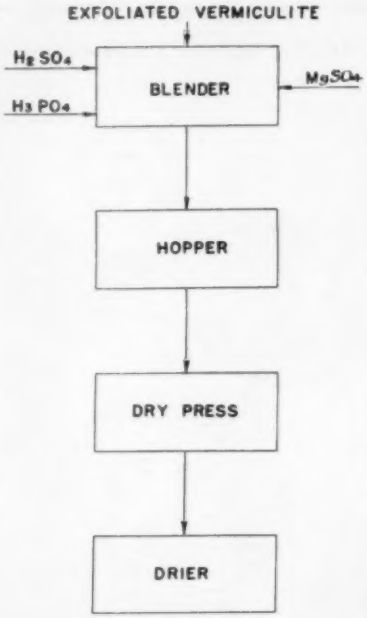

Diagram data of Patent No. 2,919,-202 shows simply the steps followed in forming the insulating block described in this patent

Vermiculite & perlite

U.S. 2,919,202—In the making of a dry-pressed, chemically-bonded insulating block or brick, exfoliated **vermiculite** in the minus 3-, plus 100-mesh range is mixed with 5-25 percent sulfuric acid, 1-10 percent phosphoric acid, and 2-8 percent magnesium sulfate. The mixture is pressed into the desired shapes at 20-200 psi. pressure, and the shapes heated to about 212 deg. F. **Pumice** or **diatomite** can be used instead of vermiculite. If good tensile strength is desired in the product, part of the vermiculite can be replaced by **asbestos** fiber. (to J. C. Ekedahl and J. H. Veale; assigned to Illinois Clay Products Co.)

Gypsum

U.S. 2,918,385—A mortar for use in connection with masonry structures located underwater consists of 30-70 percent **portland cement,** 10-36 percent calcined **gypsum** and 20-45 percent air-floated **kaolin.** (to D. J. Arpin and J. J. Arpin)

Canadian 587,557—Process for manufacturing a proteinaceous **gyp-**

(Continued on page 177)

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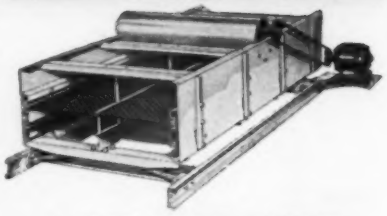

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THE FROG, SWITCH AND MANUFACTURING COMPANY
Carlisle, Pennsylvania • Established 1881

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(Continued from page 176)

sum plaster set retarder using only a single hydroxide. A slurry comprising keratin, calcium hydroxide, and water is hydrolyzed under pressure for 20 to 90 min. at a temperature of 220-300 deg. F. (to R. R. Teale; assigned to National Gypsum Co.)

Rock salt

U. S. 2,906,599-600—In a method for preparing low-sulfate sodium chloride brines from dry mined **rock salt,** the rock is dissolved in water in the presence of one or more of certain polyphosphates, with or without the addition of a small amount of an alkali earth metal cation selected from the group consisting of calcium, barium, and strontium. (to C. T. Roland and P. H. Ralston; assigned to Hagan Chemicals & Controls, Inc.)

U. S. 2,907,456—Simple and inexpensive method for treating mined **rock salt, fluorspar, sylvinite,** and similar crystalline minerals to eliminate lumps or particles containing impurities in objectionable amounts. The separation is based on the free passage of radiant heat through pure crystals of those minerals as compared with less free passage through crystals containing higher percentages of impurities. The mixed hot and cold crystals are continuously passed over a belt coated with a heat sensitive adhesive which holds the impure material while allowing the pure crystals to drop freely off the end of the belt. (to R. J. Brison; assigned to International Salt Company)

Clay

U. S. 2,907,666—In the production of **kaolin** slips of low viscosity without use of sodium hexametaphosphate or other peptizing agent, a slip comprising 65-80 percent kaolin and the balance water is kneaded in a closed vessel until enough mechanical work has been performed to raise the temperature of the slip about 10 deg. to 19 deg. C. (to N. Millman and J. B. Williamson; assigned to J. M. Huber Corporation)

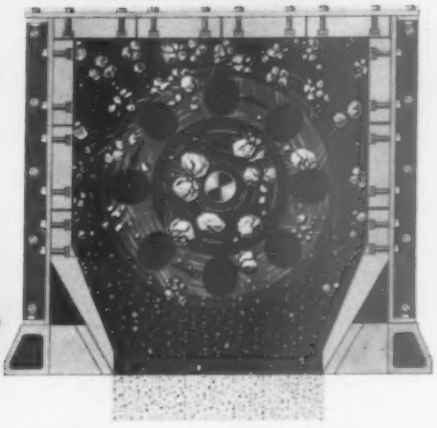
Canadian 582,143—To improve **kaolin** brightness, the crude material is subjected to negative-ion froth flotation in an aqueous pulp, using a negative ion reagent and one of the fol-

(Continued on page 178)

SIZE AND UPGRADE

YOUR AGGREGATES FOR BOTH CONCRETE AND BITUMINOUS MIX WITH

STEDMAN CAGE MILL



The Stedman Single-Cage Mill reduces Gravel and Stone, either wet or dry, via the Internal-Impact Principle. See cut above. It pulverizes unsound material to be passed off with fines—the discharged product going to wet screens, log washer, jigs, or heavy media process.

The Stedman Single-Cage Mill not only upgrades your product, but also gives the greatest percent of crushed surfaces for Black Top Mix. Example: "Crush your—2"+¼" including pea gravel to a product of ⅜" X O, screen out minus ¼" sand and furnish a specification product for Bituminous Mix with 65 to 100% crushed particles."

Variation of speeds and type of cage result in a wide variety of product sizes. Wire or write for information.

STEDMAN FOUNDRY AND MACHINE COMPANY, INC.
Subsidiary of United Engineering and Foundry Company
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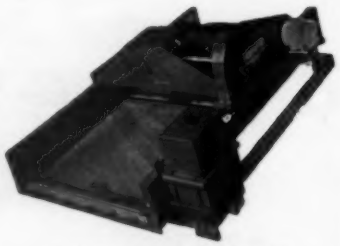

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See the **"WHERE TO BUY"** *Section*

NEW PATENTS

(Continued from page 177)

lowing reagents: ammonium sulfate, magnesium sulfate, or potassium sulfate. This patent is substantially the same as U. S. Patent No. 2,894,628, dated July 14, 1959. (to J. B. Duke; assigned to Minerals & Chemicals Corp. of America)

Canadian 582,598—Use of **attapulgite** in a joint sealing composition which resists softening and sag at elevated temperatures, e.g., paint baking temperatures up to 400 deg. F. This patent is substantially the same as U.S. Patent No. 2,894,848, dated July 14, 1959. (to M. E. Goodwin, E. W. Sawyer, Jr., and H. A. Smith; assigned to Minerals & Chemicals Corp. of America)

Feldspar

U.S. 2,918,170—For use in the removal of iron-bearing minerals, such as mica, ilmenite, iron oxides, etc., from a pulp of the ore, e.g. **silica sand** or **feldspar,** a spherical magnetized device is floated in the pulp to attract the magnetic particles. When the weight of the collected particles causes the device to sink, it is removed and cleaned by being de-magnetized. (to R. P. McNaught)

Sylvinite

U. S. 2,921,678—To recover potassium chloride from **sylvinite** containing 1-10 percent calcium sulfate as an impurity, the ore is slurried and the slurry acidified to below a pH of 4 with hydrochloric acid, treated with a cationic flotation agent and subjected to froth flotation. The recovered potassium chloride can be put through cleaner cells to obtain a product of enhanced purity. (to C. H. Fuchsman; assigned to Columbia-Southern Chemical Corp.)

U. S. 2,923,408—In an improved method for de-sliming **sylvinite,** the ore is ground, saturated in brine, and the pulp conditioned with a frother and a water-soluble acrylamide polymer, and the resulting pulp subjected to froth flotation. Clay slimes are floated. (to C. F. Williams; assigned to The Dow Chemical Co.)

U. S. 2,924,488—Design for an improved apparatus for feeding ground **sylvinite, phosphate rock** or other fine powders to an X-ray apparatus so that a continuous analysis of the material

may be made. (to J. E. Lawver; assigned to International Minerals & Chemical Corp.)

Canadian 588,694—In the beneficiation of **sylvinite** containing a small percentage of carnallite, the ore is leached with a magnesium brine saturated with sodium chloride and potassium chloride to dissolve the carnallite and then subjected to froth flotation. (to H. P. Clark and A. Adams; assigned to International Minerals & Chemical Corp.)

Asbestos

U. S. 2,923,638—Use of Canadian **chrysotile** fiber grades 7M or 7T in an asphalt adhesive composition used for affixing aluminum metal foil to roofs, tanks, etc. (to A. J. Hoiberg and C. E. Cowger; assigned to Monsanto Chemical Co.)

U. S. 2,923,639—In an asphalt composition for use in the undercoating of automobiles or forming protective and insulating coatings on roofs, tanks, etc., the preferred filler consists of a proportioned mixture of **asbestos** fiber and a fine platy mineral such as **mica** or **oystershell.** (to C. E. Wilkinson; assigned to Texaco Inc.)

U. S. 2,924,537—A laminated insulator material for protecting aircraft metals against corrosion consists, e.g., of a mixture of uncured phenolaldehyde resin and **asbestos** fiber. (to L. Wallis, W. H. Wheeler and C. H. Giemza; assigned to Martin Co.)

Fluorspar

U. S. 2,910,371—Method of stabilizing zirconia with **fluorspar** or fluorides of magnesium, cerium or yttrium. (to E. I. Ryschkewitsch; assigned to U. S. Sec. of the Air Force)

Canadian 585,194—Process for producing calcium monofluoride by reacting a mixture of **fluorspar** and calcium hydride. (to D. Goerrig and V. Luwowski; assigned to Farbenfabriken Bayer A. G.)

Nepheline syenite

U. S. 2,922,221—Use of Lakefield, Ont., Canada **nepheline syenite** or the like as the preferred friction producing agent in cermet friction compositions for brake linings, clutch facings, etc. (to H. C. Morton and E. Washken; assigned to The Russell Mfg. Co.)

END

Carrier Amplitrol Grizzly-Feeder for use with crushers separates undersized material. Tapered bars minimize blinding. Feeder control allows manual or automatic capacity control at any distance from feeder.

CARRIER *GRIZZLY*-FEEDER
with full-range capacity control

Carrier Amplitrol Grizzly-Feeders accurately control material flow rates and simultaneously scalp "fines"—assuring maximum crusher capacity and efficiency. Uniform, full-width feeding prevents uneven crusher wear. Simple, automatic controls respond instantly to crusher load fluctuations—constantly adjust Amplitrol output to produce peak crusher performance without flooding or starving.

Compare These Amplitrol Features
More capacity under head load with Natural Frequency design and *"long-stroke"* trough vibrations.
Dust- and dirt-proof drive—no close clearances to keep clean.
A.C. drive motor operates on standard power circuits—no D.C. rectifying equipment required.
Simple mechanical drive—Amplitrol drives never need "tuning." Wear plates can be added in the field without difficulty.

For more information, write for Bulletin No. 591 to Carrier Conveyor Division, CHAIN Belt Company, 213 N. Jackson St., Louisville 2, Ky.

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DEWATER • SCREEN
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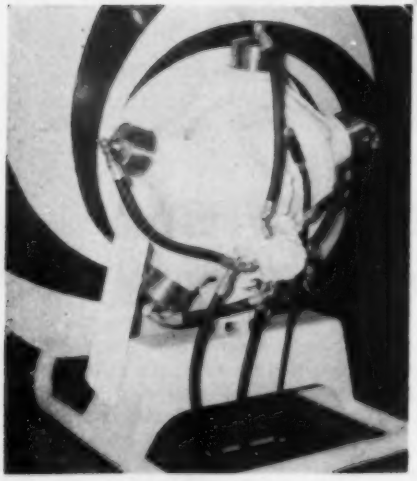
NEW MACHINERY

FOR FREE INFORMATION on these items, simply fill out and mail the postage-paid Reader Service Card found elsewhere in this issue

BEAUTY AND THE BEAST meet in a rock products producer's plant. "Beast" here is a 55-ton diesel-electric truck, one of the largest production model trucks to be offered to the industry. A 600-hp. diesel engine generates electricity to drive motors in the axle of each 6-ft. diam. wheel to give a full-load speed about 24 mph. on the level. The huge rig dumps its pay load in 27 sec. and can make a 180-deg. turn in a 25-ft. radius. Capacity is 36 cu. yd. struck or 42 cu. yd. heaped. No information was given for the smaller rig. (Unit Rig and Equipment Co., Tulsa 1, Okla.)

Enter 300 on Reader Card



MOTORS OF THE FUTURE may be star-shaped if this experimental unit sets a trend. The unconventional hydrostatic motor is the result of two years of research, design and testing. Production will not begin until endurance tests have yielded complete operating data. But the motor has a number of outstanding characteristics—high torque capacity over a range of speeds, close speed control regardless of load and great operating economy with the hydraulic pumps and controls developed especially for this application. (Chain Belt Co., Milwaukee 1, Wisconsin)

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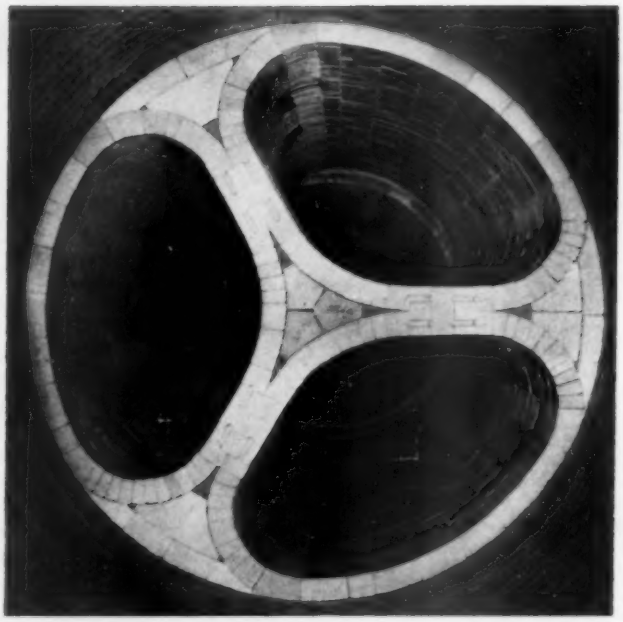

NEW LOOK IN HEAT EXCHANGERS for rotary kilns is study in esthetics as well as efficiency. This arrangement of refractory brick in a trefoil design moderates the temperature in the hottest zone, yet improves production of clinker or lime. Other advantages which have proven out in several experimental installations include fuel reduction and longer brick life in other parts of the kiln. (Harbison-Walker Refractories Co., Pittsburgh 22, Pennsylvania)

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(Continued on page 182)

HIGH PRODUCTION PITMATES
Lorain-26 Shovel and Moto-Loader boost gravel plant output

Supplying a steady flow of gravel for road reconstruction is no problem for this high-capacity Lorain team. Jefferson County Highway Dept. of Watertown, New York, uses its heavy-duty ¾-yard Lorain-26 to feed their crushing plant. Husky construction and simplified controls of the "26" make it easy to handle this 50,000-yard job.

The "26" has the power, stamina and speed for toughest digging . . . converts to hoe, crane, dragline or clamshell. Two-lever "Joy-Stick" power controls are available for combined operations. Choice of three crawlers.

Moto-Loader serves as cleanup unit as it loads out rocks that are too large for the crusher and moves them to spoil piles. With a carrying capacity of 7,000 pounds, the ML-157 has the balanced design for big production.

Power balance matches hydraulic capacity with engine size and transmission of power to the wheels . . . **Control balance** features Lorain's One-Foot Travel Control that frees operator's hands for steering and other operations . . . **Weight balance** is provided by a low center of gravity for ground-hugging, no-bounce travel.

It all adds up to faster handling to keep trucks on the move. For details, see your Lorain distributor.

THE THEW SHOVEL COMPANY, LORAIN, OHIO

LORAIN® ON THE MOVE

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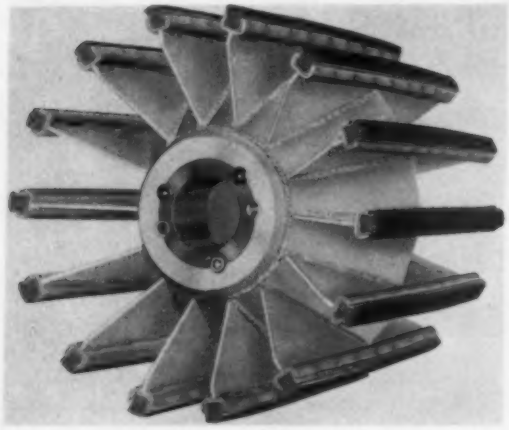

Rubber lagged wing pulley

A newly developed wing pulley has been designed to prevent build-up of fine, wet or sticky materials on the drive pulley of a belt conveyor. This is achieved by setting steel-cased rubber strips into the slats which make up the face of the pulley. According to the maker, these rubber strips compress under load and penetrate any build-up on the underside of the belt. When the arc of contact is broken as each strip rotates to the slack side of the belt, the rubber strip springs back to its original shape and automatically cleans itself.

Design of the new pulley is patented, and the registered name is Turn-Clean. It is available in diameters from 8 in. to 60 in. and from 10 in. face to 66 in. While it is offered primarily for conveyor belt service handling materials which can be expected to build up on the drive pulley, the new design of wing pulley can be adapted for the same conditions on belt type bucket elevators.

The "wings" are accurately secured to the steel cones in welding jigs. Each of the two hubs are fitted with taper-lock bushings for shaft diameters up to 10 in. The rubber strips are removable and interchangeable in the field. The manufacturer is prepared to assist design engineers to specify the new wing pulley for unusual operating conditions and for highly stressed belts. (Van Gorp Mfg., Inc., Pella, Iowa)

Enter 303 on Reader Card

Car vibrator

A hydraulic shakeout is offered for plants with only 1 to 10 cars a day to empty. The lightweight unit exerts a powerful force against the side of a gondola car to dislodge compacted or frozen materials. The unit is anchored in the ground and is electrically controlled for safe, remote operation. Vibrator drive is a 7½ hp. high-torque motor with a 3 hp. motor for the hydraulic fluid. (Hewitt-Robins, Inc., Stamford, Conn.)

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New grader blade

Good news for producers who use graders to maintain haulage roads is the development of a three-piece grader blade. Grader blade costs can now be reduced as much as 70 percent with the new design, according to the manufacturer.

The three-piece development provides a thicker-than-standard blade in the middle with a self-sharpening, hardened cutting edge. More than 5 times normal wear can be expected from the X-tra Edge blade, and savings are achieved since down-time and replacement time are reduced. Six or 8-in. wide blades are offered in a range of thicknesses. (Paper, Calmenson & Co., St. Paul 13, Minnesota)

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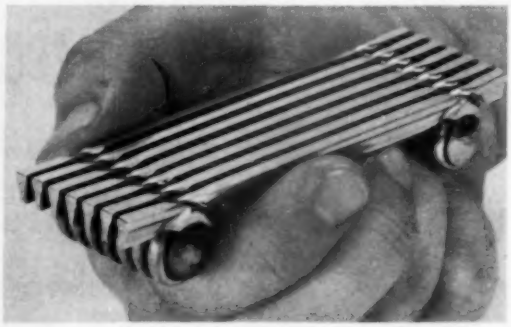
Tapered wire screen



Greater screening accuracy and higher capacity for slotted screens is now possible with a recently introduced tapered wire screen. Narrow widths of the individual wires in relation to depth permits more wires per unit of screen width, increasing the percentage of open area. Known as the Rima screen, it has been widely and successfully used in Germany for a number of washing and fine-sizing applications.

Screen wires can be fabricated in a number of profiles, including tapered, slanting, diamond and flanged; in stainless or carbon steels, and in clear openings down to .002 in. wide. Formed spacer lugs in each wire maintain the exact width for screens with long slots and, at the same time, provide rigidity in the screen and prevent lateral deflection of the individual wires. (Cross Perforated Metals, National Standard Co., Carbondale, Pa.)

Enter 306 on Reader Card

Please turn to page 184

Leaders in limestone loading

These 93-M shovel twins are half of a Marion foursome that help keep hundreds of tons of limestone rolling out of this Illinois quarry every day.

Despite their size—both pictured machines carry 2-1/2 yard dippers—these massive diesel units have the built-in agility and short cycle time of smaller machines. Uncomplicated, muscle-multiplying Marionair control gives the operators wrist action control of all machine functions... lets them crowd, swing and dump in one smooth, fast operation.

Here are units that are big and strong in the right places to keep downtime at an absolute minimum... machines with a design simplicity that makes high maintenance costs a thing of the past... profit-oriented machines that will still be carrying their share of the load years from now.

Write for bulletin 397-H today. Better yet, let a Marion mining expert explain the reasons why the 93-M will probably make dollars—and sense—in your quarry operation.

You get MORE WITH MARION

MARION POWER SHOVEL CO., MARION, OHIO

A Division of Universal Marion Corporation

Tractor shovel

The new H-30 Payloader with a 1-cu. yd. bucket now offers rock products producers the opportunity to buy a smaller-capacity front end loader with many high-efficiency features of the larger units in the line.

A 77 hp. gas engine drives an automatic transmission with a matched torque converter to give three speed ranges in each direction. The new unit features four-wheel drive, four-wheel hydraulic brakes and dual foot brake pedals to give the operator instant choice of braking with the transmission engaged or disengaged. Brakes are sealed to keep out dust, dirt and moisture.

The bucket has 8 ft. 4 in. clearance under the cutting edge when in dumping position. Boom structures are positioned to give full visibility of the bucket and maximum safety for the operator. (The Frank G. Hough Co., 705 Seventh Ave., Libertyville, Ill.)

Enter 307 on Reader Card

Hard hats

With this new line of safety hats and caps it should be easier for more safety-minded rock products producers to introduce hard hats to their workers. The new headgear is available in fibreglass, aluminum and plastic for electrical workers.

If discomfort was an objection in the past, the maker claims that his line gives "soft-hat" comfort without a top-heavy feeling. A full lining is available for winter wear and a half-liner for the rest of the year. Snap-in adjustment makes for quick fitting of the headband, while the plastic zippered sweat band can be taken out and replaced without affecting the suspension bands.

For those who are particular about color, the fibre-glass hats and caps are offered in white, red, yellow, orange, blue, brown, gray and green, but the aluminum models are available only in anodized natural color. Electrical workers' hats are made of high-dielectric polyethylene plastic to assure complete insulating safety and are obtainable only in yellow. (Bausch & Lomb Optical Co., Rochester 2, N.Y.)

Enter 308 on Reader Card

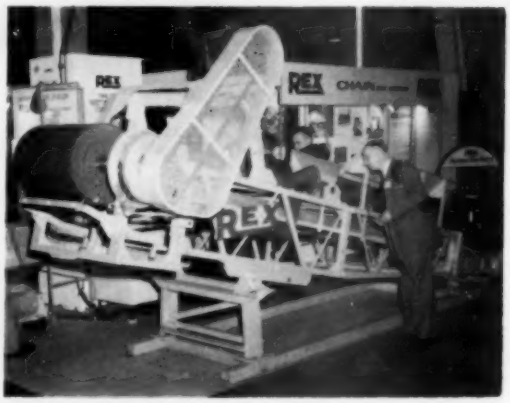
Plastic bags

During the next year a number of multi-wall bag producers will offer plastic bags to the users in the rock products industry. The new Marlex TR-101 polyethylene will provide bags of superior strength and moisture resistance, according to the manufacturer of the plastic film.

Producers are probably already familiar with ammonium nitrate packaged in this way. But tests have shown that the plastic bags will prove to be suitable for calcium chloride, barites and borates. Other possible applications may prove to be for portland cement, special cements, plasters, limes, clays and silicas. Since the bags can be made in a variety of colors and can readily be imprinted, they will lend themselves to colorful merchandising techniques to promote the product they contain. (Phillips Chemical Co., Bartlesville, Okla.)

Enter 309 on Reader Card

Sectional belt conveyors

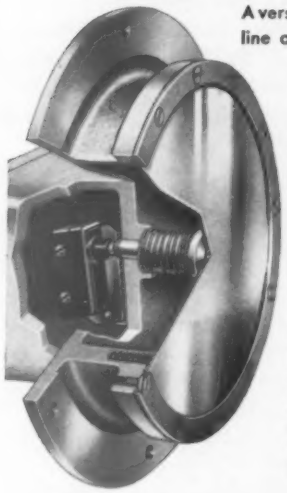


A new line of sectional belt conveyors is now available to the rock products industry. Rapid assembly of matched off-the-shelf components gives the producer all the advantages of an engineered installation without the inconvenience of special-order parts and piece-by-piece assembly.

Component parts, drives, head sections, takeup units and trusses have been designed and fabricated to give balanced performance, structural rigidity and perfect alignment for easy assembly

Please turn to page 186

NEW
AUTO-BIN-DICATOR*
AUTOMATIC BIN LEVEL INDICATOR



A versatile addition to the Bin-Dicator line of bulk material level controls.

NEW corrosion-resistant construction

NEW stainless steel diaphragm

NEW super-sensitive operation

Explosion-proof and general purpose models listed by Underwriters' Laboratories, Inc.

Prevents overflowing of bins, clogging of conveyors, choking of elevators, damage to machinery; cuts operating costs. Provides simple, reliable, positive control at low cost.

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RELIANCE HEAVY-DUTY CRUSHER

- Heavier, stable—you save money on upkeep.
- Minimum abrasion — outlasts other designs 3 to 1.
- Long jaw plates — adjustable for fineness.
- Crushing, screening and washing plants—50 to 1,500 tons-per-day capacity—engineered to your needs.

Booklet on request, pictures installations.

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___Bags
___Barges
___Belting, Conveyor Elevator, Power Transmission
___Belting, V-type
___Belt Repair Equipment
___Bin Level Indicators
___Bins and Batching Equipment
___Bits
___Blasting Supplies
___Bodies, Trailer
___Buckets
___Bulldozers
___Cars, Industrial
___Classifiers
___Clutches
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___Conveyors
___Crushers
___Coolers
___Cranes
___Derricks
___Dewatering Equipment, Sand
___Diesel Engines
___Dragline Cableway Excavators
___Draglines
___Dredge Pumps
___Drilling Accessories
___Drills
___Dryers
___Dump Bodies
___Dust Collecting Equipment & Supplies
___Electric Motors
___Engineering Service Consulting and Designing
___Explosives & Dynamite
___Fans and Blowers
___Feeders
___Fifth Wheel Heavy Duty Special
___Flotation Equipment
___Front End Loaders
___Gasoline Engines
___Gear Reducers
___Generator Sets
___Grinding Media
___Gypsum Plant Machinery
___Hard Surfacing Materials
___Hoists
___Hoppers
___Kilns: Rotary, Shaft, Vertical
___Locomotives
___Lubricants
___Magnetic Separators
___Mills
___Pipe
___Pumps
___Scales
___Screen Cloth
___Screens
___Scrubbers: Crushed Stone, Gravel
___Shovels, Power
___Speed Reducers
___Tanks, Storage
___Tires and Tubes
___Torque Convertors
___Tractor Shovels
___Tractors
___Trailer Dump Bodies
___Trucks, Bulk Cement
___Trucks, Industrial
___Trucks, Mixer Body
___Trucks, Motor
___Valves
___Vibrators
___Welding and Cutting Equipment
___Winches
___Wire Cloth
___Wire Rope

If equipment you are in market for is not listed above, write it in space below.

_____

_____

The principal rock product(s) manufactured by my company is/are indicated "1", "2", "3", in order of importance below.

___Crushed Stone
___Sand & Gravel
___Slag
___Cement
___Lime
___Gypsum
___Ready Mix Concrete
___Concrete Products Type_____
Other nonmetallic mineral (What?)_____

All above information is strictly confidential to be used to guide the manufacturers in supplying proper information.

Please Check Service Desired

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☐ Prices ☐ By mail ☐ Urgent

NOTE: See—Where to Buy-Classified Advertising Section for used equipment and complete plant information

Name _____
Title _____
Firm _____
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City and State _____
Your Signature _____ Title_____

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LIME . . . CEMENT KILNS

VULCAN OF WILKES BARRE CAN DESIGN & MANUFACTURE JUST THE TYPE YOU NEED

All equipment made by Vulcan must measure up to the standard of quality and responsibility it has taken 111 years to earn. Contact Vulcan today . . . estimates, constructive suggestions and preliminary drawings will be furnished (as far as possible) without obligation.

VULCAN IRON WORKS INC.

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4-60

ROCK PRODUCTS **SUBSCRIPTION ORDER FORM**

for	One year	Two years	Three years
U. S. POSSESSIONS & CANADA	☐ $ 3	☐ $ 4	☐ $ 5
PAN AMERICAN	☐ $ 8	☐ $14	☐ $20
FOREIGN	☐ $12	☐ $22	☐ $30

☐ Payment Enclosed ☐ Bill me later ☐ Bill my Company

YOUR COMPANY _____

COMPANY ADDRESS _____

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Your position or title _____
(This is important in evaluating editorial emphasis)

I would like to see more ROCK PRODUCTS articles on:

_____

_____

Please complete the form below indicating the principal product your company produces. If more than one, number in order of importance.

☐ Crushed Stone ☐ Lime
☐ Sand & Gravel ☐ Gypsum
☐ Slag ☐ Ready Mix Concrete
☐ Cement ☐ Concrete Products

Type _____

Other nonmetallic mineral (What?) _____

NEW MACHINERY

continued from page 184

in the field. The manufacturer makes many of the individual parts including roller chain drives, bearings, conveyor idlers and drive sprockets.

Standard 24-in. deep truss sections are available in 6, 9 and 21-ft. sections: 42-in. deep trusses can be supplied in 16, 20 and 24-ft. lengths for particularly long or heavily loaded spans. (Chain Belt Co., Milwaukee 1, Wis.)

Enter 310 on Reader Card

Tractor loader

The value of this manufacturer's line of tractors has been greatly extended with the development of a subframe and hydraulic package attachment to mount a "super-duty" loader, backhoe or counterweights on the tractor.

The new attachment permits the fast, full-power operation of the $\frac{5}{8}$ or $\frac{3}{4}$-cu. yd. loading bucket. A capacity load can be lifted to a height of 11 ft. Break-away capacity of the unit is 5,500 lb. and lifting capacity is 2,500 lb. (Ford Motor Co., Tractor & Implement Div., Birmingham, Mich.)

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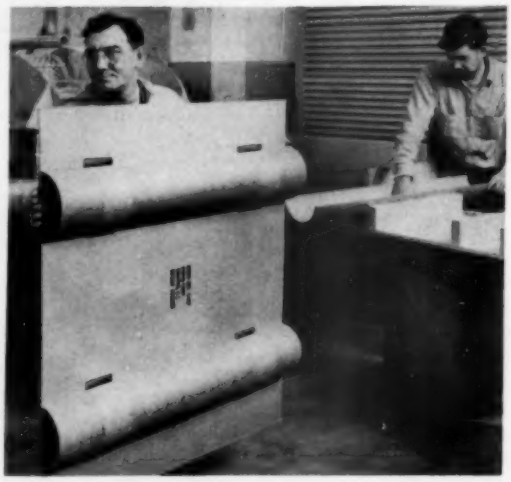
Paperboard pallets



Lightweight, easily-assembled pallets are now available to rock products producers who ship any portion of their output in bags. Paperboard semicores are securely fastened to a sheet of double-wall corrugated board in the producer's plant, and can be centered to accommodate the forks of any lift truck.

The whole assembly weighs only 8 lb. compared with nearly 100 lb. for a conventional wood-

en pallet. This permits great savings in dead weight. In spite of low weight, the paperboard pallet assembly easily supports 30 to 36 bags.

Other advantages include 1-min. assembly in a simple jig, smooth surfaces without the hazards of puncturing bags with nails or slivers and low cost which permits the pallet to be discarded when it has served its purpose. (Union Bag—Camp Paper Corp., 233 Broadway, New York 7, N.Y.)

Enter 312 on Reader Card

Six-cu. yd. shovel

A big new 6-cu. yd. shovel has specially-designed, integrated controls to simplify and speed up operation of the huge unit. Each clutch control lever in the pilot house is a throttle, and each movement of the machine is regulated by movement of the lever.

These controls are said to give exceptional speed and operator control too, when the unit is outfitted as a 7-cu. yd. dragline. Double-drum braking surfaces increase the number of operating cycles. There is no clutch slippage at any time on either shovel or dragline work; no brakes are needed to stop the swing since the torque converter absorbs shock and thrust with each change in direction.

Other features of the new Model 4500 Vicon include interlocked hoist and drag drum, dual engine drives, tubular dipper stick and quick disassembly for truck or rail movement between jobs. (Manitowoc Engineering Co., Manitowoc, Wisconsin)

Enter 313 on Reader Card

Gyratory crusher gauge

For the first time a crusher manufacturer has worked out a way of letting the operator of a gyratory crusher determine its actual close side setting. This is accomplished without lead plumbs

Please turn to page 188

THURMAN SCALES

PORTABLE • DEPENDABLE • ECONOMICAL

Portable or Pit . . . Take your pick!

Deck length to 43 ft.

PORTABLE TRUCK SCALE ruggedly built and Thurman engineered to meet demanding requirements of accuracy and portability. A HEAVY DUTY SCALE that can be moved as a unit and is ready to weigh in an hour or less at new job site.

FEATURES INCLUDE:
- Capacities to 75 tons.
- Solid steel checkered deck.
- Full depth heavy welded steel end stands.
- Chrome plated weigh beam.
- Free-floating ball bearing deck suspension.

ECONOMY ENGINEERED for low cost accurate weighing with minimum foundation requirements, the MODEL S may be used as a shallow pit scale in permanent locations or as an economy portable.

Deck length to 43 ft.

FEATURES INCLUDE:
- Capacities up to 50 tons.
- Pre-mounted corner stands.
- Free-floating ball bearing deck suspension.
- Deck structure prepared for Timber Cover (steel optional), etc.
- Chrome plated full capacity weigh beam.
- Ticket printing weigh beam (optional).

Also see Thurman first for the finest in: • Standard Pit Scales • Industrial Scales • Automatic Scales • Weight Printers & Recorders • Warehouse Scales • Liquid Weighing Scales • Batching Scales • Wheelbarrow Scales

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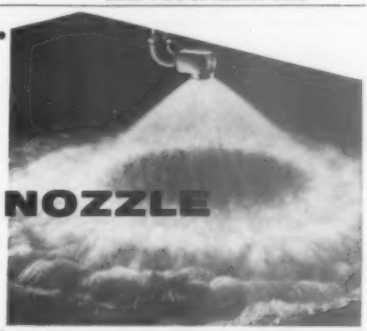
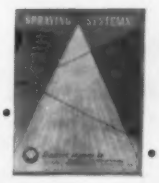


got a **SPRAY NOZZLE** *problem?*

perhaps one of our **DATA SHEETS** *can suggest a solution*

For almost every spraying application, there's a Spraying Systems Data Sheet that gives useful information on suggested installations and types of nozzles to use. If you have a problem, write and let us know the application involved . . . and we'll send the Data Sheet that applies.



SPRAYING SYSTEMS CO.

3285 RANDOLPH STREET • BELLWOOD, ILLINOIS

And . . . for complete spray nozzle information, write for Catalog 24.

Enter 1491 on Reader Card

T.C.
WRITE FOR CATALOG 56
DURABLE
ECONOMICAL
WOVENWIRE
SCREENS
KNOWN AROUND THE WORLD
TWIN CITY IRON & WIRE CO.
35 W. WATER STREET · ST. PAUL 7, MINNESOTA
Enter 1492 on Reader Card

Slurries... handled at lower cost

The new WILFLEY MODEL K Centrifugal Sand Pump embodies important mechanical improvements especially adapted to the handling of cement slurry and results in stepped-up production and substantial power savings. Individual engineering. Write for details.

Buy WILFLEY for Cost-Saving Performance

A. R. WILFLEY and SONS, Inc.
Denver, Colo., U.S.A.

WILFLEY centrifugal PUMPS
Enter 1493 on Reader Card

MONTH AFTER MONTH
YEAR AFTER YEAR
ROCK PRODUCTS
GIVES ITS READERS
THAT EXTRA IMPACT
THAT MAKES FOR
EXTRA PROFITS

FOR 62 YEARS ROCK PRODUCTS has been the editorial and market research leader in the world of cement and its sister industries. Over 17,600 readers pay to get ROCK PRODUCTS for its timely, informative articles. Enter your subscription now and take advantage of the powerful and exciting suggestions for profitable plant operations that appear in every issue.

ROCK PRODUCTS
79 West Monroe Street, Chicago 3, Illinois

NEW MACHINERY

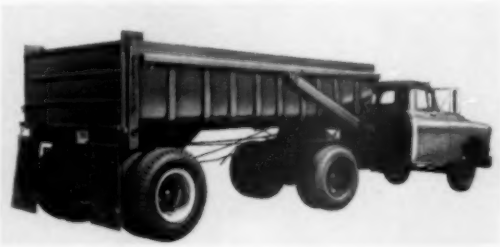
continued from page 187

or entering the machine, and works with the hydraulic adjustment of the main shaft even while the machine is in operation.

An electric probe within the bottom shell senses the movement of magnets secured to the movable cylinder of the hydraulic adjustment mechanism. The signal is sent to an indicating instrument which can be mounted in any convenient location. (Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.)

Enter 314 on Reader Card

Cable-dump truck



Greater dumping efficiency and lower cost are features of a new cable-dump truck. Lift arms on the outside of the body make it possible to raise the body with 22 percent less line pull. As a result, a 25 percent increase in dumping time is claimed. A 40,000-lb. payload can be lifted with a winch using only three sheaves.

Cost of the unit is $500 less than other comparable models. About 1,000 lb. lower deadweight permits more live load capacity. Added capacity is possible with the top-hinged, automatic tail gate. (Fruehauf Trailer Co., Detroit 32, Mich.)

Enter 315 on Reader Card

Fan-cooled worm reducers

More horsepower per dollar is promised for a new line of worm gear reducers with ribbed housings and fan cooling. This design removes the limitations of thermal ratings from many units in the line and permits the use of smaller reducers for a given horsepower.

This manufacturer already offers one of the most comprehensive line of worm gear reducers, and the fan-cooled design is available in the same wide range of types and sizes. Rock products producers will probably find that the right-angle drives in single worm and helical worm design best meet their needs. But the units are offered in double worm reduction and in an exceptional variety of housings and shaft projections.

External cooling is accomplished with a small

aluminum fan which passes air over the finned sides of the housing. Internal cooling is aided by splash lubrication from an oil reservoir and by internal channels which direct oil to the high speed bearings. The low-speed bearings have grease lubrication.

Where space is at a premium, a "universal" housing permits the motor to be mounted directly on the reducer. A short-center chain or V-belt drive connects the motor to the input shaft of the reducer to make a simple, compact drive.

Single worm reducers are available in speed ratios up to 70:1 and up to 135,000 lb.-in. torque ratings. Double worm units provide up to 1,400:1 reductions with the same torque capacity. (Link-Belt Co., Prudential Plaza, Chicago 1, Ill.)

Enter 316 on Reader Card

Pipe fittings

For the first time the rock products producer with washing equipment can purchase a complete package of couplings and fittings for his plain-end pipe system. These new Plainlock fittings substantially reduce the costs of making a leak-proof system for fresh water or tailings disposal. Plain or beveled pipe can be coupled without further preparation: The stainless steel grippers and plastic gaskets are said to provide positive leakproof grip on the pipe ends.

The fittings can be applied best to Schedule 40 steel pipe in sizes from 1 in. through 6 in. but can be used readily on pipe of other materials and other wall thicknesses when lower than maximum pressures are practical.

Couplings and fittings can be applied with unskilled labor and can be quickly and easily removed for alterations, repairs or relocation of the piping system. (Victaulic Company of America, 835 Lehigh Ave., Union, N.J.)

Enter 317 on Reader Card

Hard-facing rod

Dipper teeth, bucket lips, crusher parts and screen plates subject to wear from impact and abrasion can now be built up with a nickle-manganese rod especially designed for this service.

The composite, 14-percent manganese electrode is particularly suitable for smooth economical buildup of these parts. Slag coverage is said to be complete and spatter low. Hardness of the deposit ranges from 170 to 230 Brinnel as placed but will work-harden to about 550 Brinnel.

Available in 14-in. rods and in diameters from ⅛ to ¼ in., they can be used with either an ac. or dc. reverse polarity power source. (Air Reduction Sales Co., 150 E. 42nd St., New York 17, N.Y.)

Enter 318 on Reader Card **END**

Looking For a Reliable, Efficient CONTRACT DRILLER?

ON YOUR NEXT TOUGH DRILLING JOB . . . CONSULT HARVEY DRILLING

EXPLORATORY CORING
DIRECTIONAL DRILLING
GROUT HOLE DRILLING
FOUNDATION TESTING

Hoffman Diamond Core Bits and Accessories available through Harvey Drilling

Long time specialists in deep hole diamond coring for alluvial deposits.
Harvey Drilling assures you of prompt, accurate results under the most difficult coring conditions.

Completely dependable results in hard, soft or abrasive formations . . . accurate, detailed reports for future planning . . . better returns on your exploration investment. Just a few of the reasons why it will pay you to get in touch with Harvey Diamond Drillers.

Phone or Write for Estimate At No Obligation

HARVEY DRILLING COMPANY
902 East Main St., Clarion, Pa. Phone: Capital 6-7210

Enter 1481 on Reader Card

PLATEGRIP
PLATE FASTENERS FOR CONVEYOR BELTS

Make strong dust-tight, water-tight joints in belts of any width. Special design spreads tension uniformly across belt, allow natural troughing of belt and assures smooth operation over flat, crowned or take-up pulleys. Sizes for belts of from ¼" to 1½" thickness. Write for Catalog Sheet.

ARMSTRONG BRAY & CO.
5306 Northwest Highway, CHICAGO 30, U. S. A.

Enter 1482 on Reader Card

WHAT ARE YOU PAYING FOR REPAIRS?

The money you are paying to keep worn-out equipment working may be just enough for you to own better equipment.

See the **"WHERE TO BUY"** *Section*

MANUFACTURERS NEWS

HERE A GROUP WATCHES Lab Technician R. C. Herzfeld conduct experiments with a laboratory model of a new on-line censor designed for continuous process analysis. He is inserting a tungsten sample for reference reading. Looking on are, left to right, L. C. Sheldon, Industrial X-Ray representative, Chicago; Heinrech Kurcz, International General Electric, and George Bianchi, ASD field sales representative, Seattle

G.E.'s Industrial X-Ray unveils marketing concept

A NEW MARKETING CONCEPT which is expected to have widespread significance on the sale and service of industrial x-ray equipment in the chemical, steelmaking, petroleum, mining, cement and paper industries has just been unveiled at a five-day sales conference in Milwaukee by the Industrial Section of the X-Ray Department of the General Electric Co.

Participating in the week-long sales program were about 100 ASD and Industrial X-Ray representatives. Principal objective was to outline broad marketing procedures designed to make maximum use of the respective talents of both sales networks.

Involved in the sales augmentation are the far flung forces of General Electric's highly skilled sales network. Both will now handle the sale of industrial x-ray equipment.

According to J. D. Webster, industrial sales manager, purpose of the sales broadening is to provide greater customer service on all jobs—both large and small.

A return sales session is tentatively planned at Schnectady, home of ASD. At the same time, smaller regional education seminars between ASD and Industrial X-Ray field personnel will be conducted throughout the country.

Continental names sales manager

J. E. CARROLL has been appointed sales manager of the Continental Conveyor and Equipment Co., Birmingham, Ala. A graduate of Georgia Institute of Technology, Mr. Carroll has been associated with Continental Conveyor's predecessor company since 1944 and has been district sales manager in Atlanta since 1951. In his new position, Mr. Carroll will be in charge of all sales activities with offices in Birmingham until the company's new plant and office building is completed at Winfield, Ala.

Bell appointed manager

EUCLID DIV. OF GENERAL MOTORS has announced the appointment of A. A. Bell as manager of their branch in Minneapolis, Minn. Mr. Bell has been a Euclid district representative in the eastern sales region prior to this new appointment. He is succeeded in the eastern Pennsylvania and Maryland territory by W. R. Brown who was formerly associated with sales operations of the Euclid branches in Minnesota.

Hertz to lease big equipment

HERTZ CORP. announces that it is entering the equipment leasing field. Walter L. Jacobs, president said the company will stress leasing of equipment associated with trucks and cars, such as bulldozers, interchangeable containers and mobile fork lifts.

(Continued on page 192)

MEASURABLE SALES ACTION from ROCK PRODUCTS ADVERTISING

These authentic verbatim reader reports cite specific sales actions that result from advertising in ROCK PRODUCTS magazine

ROCK PRODUCTS' readership is measured by McGraw-Hill's famous "Reader Feedback" personal interviews. Frequently, during these interviews, readers comment on the direct action taken after reading specific advertisements. ***for example . . .***

These are among the specific actions taken after seeing this ALLIS-CHALMERS advertisement in ROCK PRODUCTS:

"I'll definitely take action on this, I'm planning to clip the ad and turn it over to the president of our company. When he finishes, he'll turn it over to our operating men to get their thinking."
Plant Operation Manager
Crushed Stone and Slag Co.

"I drew the ad to the attention of others I work with. Some of the others get the magazine and had seen the ad."
Quarry Foreman
Crushed Stone Co.

"I contacted this company's service engineer . . ."
Vice President
Limestone Co.

"I'll pass this on to our operating engineers in this area. This may be the answer to the problem in one of our plants."
Company Secretary
Crushed Stone and Gravel Co.

ROCK PRODUCTS advertising gets results because of its —

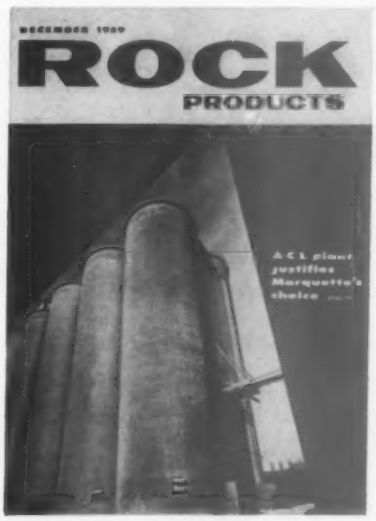
High Readership among top-level management and operating executives who make or influence buying decisions.

Editorial Service that is geared to today's needs for concise, authentic reporting.

Modern Format that gets attention for Rock Products' editorial and advertising pages.

They're solid reasons why results like those above are commonplace to ROCK PRODUCTS' advertisers among the men who buy. They are mighty important men to reach, and you can reach them in ROCK PRODUCTS magazine.

ROCK PRODUCTS
Maclean Hunter Publishing Co.
79 West Monroe St., Chicago 3
Also publishers of Concrete Products magazine



READ BY 17,600 TOP-LEVEL MANAGEMENT AND OPERATING EXECUTIVES.

(Continued from page 190)

Regional office for Insley

THE INSLEY MFG. CORP. has announced the opening of a Western regional office at 2821 W. Mission Rd., Alhambra, Calif. J. Ray Elliott, vice president, will assume the office of manager of this new regional office.

All functions including sales, service and parts will be provided for the following western states: Washington, Idaho, Montana, Oregon, Utah, California, New Mexico, Arizona, Colorado, Nevada, Wyoming, Alaska and Hawaii. British Columbia is also included in the territory coverage. District sales representatives under the supervision of the new office will include Ed V. Walsh and J. L. Lamley.

Grede elected president of Case

WILLIAM J. GREDE has been elected president of the J. I. Case Co., succeeding Marc B. Rojtman, who assumed the important new position of special advisor to the president and the Case executive committee.

Following his election Mr. Grede commented, "We have been trying for some time to free Mr. Rojtman from detail and routine administration so that he could devote his tremendous drive and creative abilities to the more challenging aspect of our rapidly expanding operations at home and abroad."

William Grede is a prominent industrialist and former president of Grede Foundries, Inc., which he founded and developed into a seven-plant operation and one of the largest independent producers of iron and steel castings in the country. Mr. Grede has been the head of the Case executive committee since 1956, and was instrumental in the merger of the Case Co. with American Tractor Corp., whose construction, roadbuilding and materials handling line has been spearheading Case's growth during the past three years.

KOLMAN Radial Stackers Minimize Material Segregation

100'x24" Stacker is one of four Kolman Stackers used in the production of aggregate at Squaw Valley, California, in preparation of roads and site for the 1960 Winter Olympic Games. Stackers in the background are 70'x24".

PNEUMATIC-TIRED STACKERS IN LENGTHS UP TO 150 FEET

Reports of outstanding performance by the Kolman Model 101-R Radial Stacker are rolling in from all parts of the country. Owners are enthusiastic about bonus features offered by the Kolman Stacker — features like cable suspension of the boom, two-position wheels, balanced electric drive on the head section, power lift, power travel, and cam hinge. Sizes up to 150 feet long build larger stockpiles with a single setting.

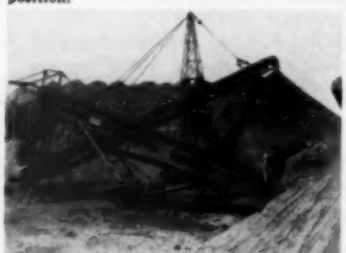
MINIMUM SEGREGATION

Kolman's cable suspension design eliminates the segregation encountered with stackers having fixed discharge heights. By raising the stacker as the pile is built, the fall of material is kept at a minimum.

MAXIMUM PORTABILITY

Even the largest Kolman Stackers are on dual pneumatic tires that roll easily on any level surface. Wheel assembles are mounted in quick-change frames to easily shift from radial arc position for stacking to parallel position for moving from one location to another in the stockpile area.

150'x30" Stacker shown includes electric power lift and electric power travel for finger-tip control of stacker discharge position.



100'x24" Stacker in the background stockpiles sand produced with an 8'x48" double-deck vibrating screen on a Model 101 Kolman Portable Conveyor-Screen Plant.

WRITE FOR LITERATURE

KOLMAN MANUFACTURING CO.

4200 West Twelfth Street Sioux Falls, S. D.

Chesapeake appoints distributor

THE CHESAPEAKE SUPPLY and Equipment Corp., Baltimore, Md., has been appointed distributor for KA-MO products by the Kwik-Mix Co., Port Washington, Wisc., a division of Koehring Co. Territory assigned the new distributor includes Maryland, Delaware, the District of Columbia and the northern sections of Virginia and West Virginia.

Assistant sales head named at Stedman

HAROLD R. KRUEGER has been appointed to the newly created position of assistant sales manager of the machinery division of Stedman Foundry and Machine Co., Inc., Aurora, Ind.

Enter 1494 on Reader Card

Mr. Krueger has served the company as a sales representative for the past five years.

Hitch and Boling move up at Dorr-Oliver Inc.

J. D. HITCH, JR., former president, has been appointed board chairman of Dorr-Oliver Inc., Stamford, Conn. He is replaced as president by L. R. Boling, formerly executive vice president.

Mr. Hitch, with the company since 1927, has been Japanese representative of the former Dorr organization, export manager, vice president for sales, and then president. Mr. Boling moved up with the organization on the financial side, serving successively as assistant controller, controller, secretary and treasurer of the former Oliver United Filters Co. Dorr and Oliver merged in 1954, forming the present company.

New look in machinery

THE NATION'S ROAD builders are offsetting rising costs of materials, land and labor by using new, boldly designed, multiple purpose construction equipment, it was said by John A. Baldinger, vice president of The Yale & Towne Mfg. Co.

In a statement released at the 41st Annual Convention of the Associated Equipment Dealers of America, Mr. Baldinger credited "the designers and producers of construction machinery with making it possible for road builders to get approximately the same mileage per dollar spent in this year's $5.7 billion public highway program as five years ago."

The Yale & Towne executive said "the construction equipment industry, one of the major capital goods segments of the economy, must continue to design and manufacture machines with multi-functional versatility and increased work capacities as an aid to the heavy construction industry in its relentless fight against high costs."

Tock appointed to engineering staff

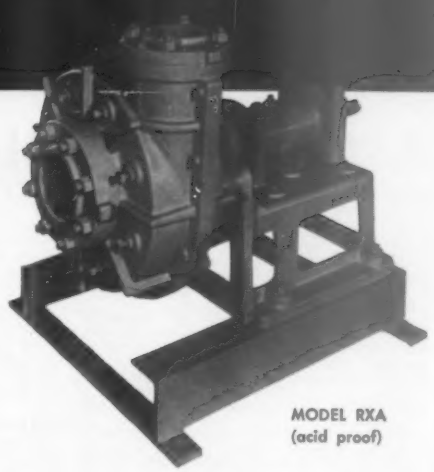
WILFRED H. TOCK has been appointed to the engineering staff of the Traylor Engineering and Manufacturing Div. of Fuller Co. Mr. Tock will be located in the firm's main offices in Allentown, Pa., and is assuming his new position immediately. His assignment specifically will deal with the application of kilns, coolers and dryers in the chemical industry.

For the past two years, Mr. Tock has been a member of the engineering staff at Basic Inc. in Cleveland where he was engaged in the development of high-temperature kilns. From 1949 to 1957 he specialized in rotary kilns at Allis-Chalmers, and among the many unusual and specialized "Rotaries," Mr. Tock developed a kiln for use in the production of taconite.

END

NEW!

PERFORMANCE-PROVED CERAMIC-LINED SAND PUMP



MODEL RXA (acid proof)

ARE YOU USING pumps for transferring fines? Is the volume in the range of 110′ head-150 GPM to 70′ head-600 GPM?

ARE YOU TIRED of replacing impellers, liners, shells, sleeves, seals, bearings, shafts, bolts, nuts, gaskets, etc., every few months?

ARE YOU WISHING someone would produce a pump worthy of your expectations? Something that would hold up for say — 14 months? 18 months? 2 years!

YOU WILL FIND the ultimate in wear resistance in ceramic lined pumps using silicon nitride bonded silicon carbide wear parts.

SOUND EXPENSIVE? Not at all. Cost is comparable to alloyed iron or rubber lined pumps.

For additional information on the new MODEL RXA Ceramic-Lined Sand Pump, write:

The KANSAS CITY HAY PRESS COMPANY
801 Woodswether Road Kansas City 6, Missouri

Enter 1479 on Reader Card

WHERE TO BUY

Mail to: **ROCK PRODUCTS**, Where To Buy Dept.,
79 West Monroe St., Chicago 3, Illinois

DATE _____

ADVERTISER _____

BY _____

ADDRESS _____

CITY, ZONE & STATE _____

Remittance Enclosed
Terms: 10 days after receipt of invoice

RATES FOR ONE INSERTION

Column Inches Used	Rate Per Column Inch
Space (Inches)	1 Issue
1	$10.25
2-9	10.00
10-19	9.75
20-30	9.50

Lower rates on a contract basis. Write for rate card.

ATTACHED COPY to appear in issue(s) checked

Forms close 12th of Month Preceding Publication

Jan. .....July .....
Feb. .....Aug. .....
Mar. .....Sept. .....
Apr. .....Oct. .....
May .....Nov. .....
June .....Dec. .....

BLIND ADVERTISEMENTS
Box Numbers will be assigned to ads without extra charge, if the advertiser desires.

Send inquiries to the Box Number c/o Rock Products, 79 W. Monroe St., Chicago 3, Ill. They will be forwarded to the advertiser. Rock Products cannot disclose advertisers' name or answer inquiries.

MOST EVERYTHING FOR AGGREGATE HANDLING

Truck Dump Hopper

CONVEYORS
1—14" x 100' Belt, steel frame, Exc.
1—18" x 178' Belt, steel frame, 7½ HP.
3—6" x 43' Carpco, BC-68, sliding belt.
2—6" x 33' Carpco, BC-68, sliding belt.
1—60" x 150', steel framework, 100 HP. gearmotor
1—42" x 1250', Link Belt, 2—100 HP. gearmotors
1—36" x 645' Link Belt, 100 HP. gearmotor
1—42" x 870' Link Belt Trailing Type and Conveyco mobile stacker, 100 HP. gearmotor 440 V.

CRUSHER, JAW
1—10 x 20 Pacific w/25 HP. & Starter
1—10" x 24" (Size 50) Kue-Ken, 25 HP. 440 V
1—36" x 42" Birdsboro-Buchanan, 100 HP. 440 V.
1—2½" x 4" Braun chipmunk, 2 HP. 220/440 V
2—2¼" x 3 Braun chipmunk, ¾ HP. Motor
1—15" x 36" Universal, 50 HP. 220/440 V.

CRUSHER, GYRATORY & CONE
1—2'4" Traylor TY, Less Motor
1—4' Symons, Shorthead, 150 HP. motor
2—5½' Symons, standard, 200 HP. motor

CRUSHING PLANTS
1—10" x 36" Pioneer Model 40 V, UD 24 Diesel Power.
1—15" x 24" Cedar Rapids Portable, Case Gas Power
1—10" x 16" Cedar Rapids Pitmaster, Complete UD 14 Diesel

DRYER
1—36" x 13' Hardinge Ruggles Cole Complete excellent. Located Clearwater, South Carolina

FEEDERS
1—36" x 8'4" Link Belt, Apron, 3 HP. motor
1—20" x 6' Schaffer Poidometer Constant weight
1—36" x 72" Jeffrey Traylor Grizzly Feeder, 440 V.

HOPPER
Conveyco truck dump station, Hopper 15' x 15' x 10' with tilting Grizzly, 4' x 8' plate feeder, all complete with Hydraulic cylinders, gearmotor drives.

KILN
1—48" x 30' Hardinge Ruggles Cole, Complete Excellent. Located Clearwater, South Carolina

MILLS, BALL & ROD
1—4' x 10' Marcy Rod Mill, 75 HP. 440 V.
1—3' x 8' Hendy Rod Mill, 30 HP. 440 V.
1—5' x 10' Marcy Ball Mill, 100 HP. 440 V.
5—8' x 9' Traylor Ball Mills, 250 HP. 2300 V.
1—5' x 8' Traylor Rod Mill, 150 HP. 440 V.
3—5' x 14' Marcy Ball Mill, 100 HP. 2200 V.

SEPARATORS
1—Type D-1A Exalon, 3 unit Vertical Roll Type
6—Type MI-418 Carpco High intensity
2—Type HT-460 Carpco, High Tension

SCREEN
1—9' dia. x 54½' Yuba Trommel, 100 HP. West. 440 V.
4—4' x 12' Tyler Ty-Rock, F-600, 10 HP. 220/440 V.
1—4' x 8' Symons Rod Deck Screen, 7½ HP. 220/440 V.
1—4' x 8' Tyler Hummer, Type 38
2—6' x 12' Allis Chalmers lowhead, 10 HP. 220/440 V.
6—4' x 5' Tyler "Hummer", type 50 Head

SHOVELS
1—Model 111 M Marion shovel & Dragline, Diesel Electric 4 yd., 100' Dragline Boom
1—Model 170 B Bucyrus Erie Electric shovel Essco Bucket, 2400/4160 Y, Rotoclone Air Filter system, Complete with rubber cable, and Junction Box.

WEIGHTOMETER
1—36" Merrick Model E with Electric Recorder
1—12" Merrick Type S. Excellent Condition
1—24" Merrick Model E.
1—14" Fairbanks Morse Conveyor Scale, Exc.

WHEELS, DEWATERING
4—12'—6" x 4' Conveyco Sand Wheels, Complete with Tank, w/20 HP. West. gearmotors, Exc.

GET OUR LIST of EQUIPMENT
AMERICA'S LARGEST MINING EQUIPMENT LIQUIDATORS
MACHINERY CENTER INC.
1201 South 6th West PO Box 964 HU 4-7601 Salt Lake City 10, Utah

INVENTORY SALE

Cranes—Hoes

Manitowoc 1600 Lift Crane, 50' Boom, Jib, Diesel power.

Lorain TL20 Truck Crane, 50' Boom, Ind. Boom, gas power.

Insley K-12 ½ yd. Hoe, long tracks, Chrysler gas.

Bantam M-49 Lift Crane, 40' Boom, GMC 6x6 Crane Carrier, outriggers—Perfect.

P&H 255A Shovel Attachment, ¾ yd.

Lorain TL20 Shovel Attachment, ½ yd.

Truck Mixers

Jaeger 5 Yd. Continental engine, open end, new 1951; on I-H LF190 Tandem

Rex 3½ yd. Chrysler engine, flush tank; on I-H LF172, 5 speed—3 speed, 825 tires—Clean & priced right.

16 Mixers in stock—All Traded on New Rex Mixers.

Crushing Equipment

Gruendler 2X8 Hammermill—bare—good—cheap.

Universal TDS30 Portable Secondary Plant, 800 Series, 30" Twin Dual, 4x12—2½ D. screen, 30" conveyors, & Cat Power.

120 S. Pierpont WO 4-6706
EIGHMY EQUIPMENT COMPANY
ROCKFORD, ILLINOIS

DEPENDABLE USED MACHINES
Model 360 Hopto mounted on a GMC tandem truck powered by gasoline engine

4T Vermeer ditcher	Insley ¾ yd. clam & drag	Unit 1020 ⅜ yd. Diesel hoe
524T Vermeer ditcher	Quickway backhoe on ½ track	Ferguson TD35 hi-lift & hoe
Unit 514 ½ yd. backhoe	5x16 Telsmith d.d. screen	Cable controlled D7 dozer
5x14 Telsmith d.d. screen	Amer. 375 ⅜ yd. dragline	Cat. eng. power unit D-311
4x10 Telsmith d.d. screen	Ford tractor w/Arps trencher	Barber-Greene Disc. type loader

This equipment rebuilt in our modern plant by expert mechanics. Come see it!
10002 Southwest Highway TRACTOR & EQUIPMENT CO. Oak Lawn, Illinois

FOR SALE

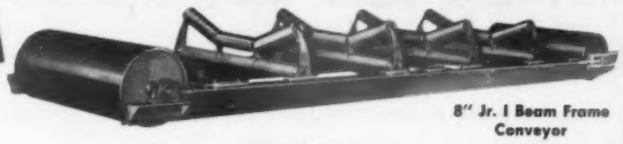
3—10' x 78' Dryers with 200 HP Motors
4¼' Symons Std. Coarse Bowl
2—5½' Symons Std. Med. Bowl
30" Merrick Weightometer

Stanley B. Troyer Equip. Co.
Box 97, Crosby, Minnesota

BONDED QUALITY BARGAINS

CURRENT MODELS - IMMEDIATE SHIPMENT FROM OUR FACTORY - WRITE, WIRE OR PHONE FOR FREE CATALOG AND PRICES

BONDED® TROUGHING IDLER CONVEYOR BARGAINS



8" Jr. I Beam Frame Conveyor

Truss Frame Conveyors

- Built Like A Bridge
- For High Tonnages
- Clear Spans To 50 Ft.
- Any Length — Any Belt Width

Complete Pre-Fab sections of 8" Jones and Laughlin Jr. I Beam Frame Conveyor, quickly and easily joined together on the job. These beams are rolled with .20% Copper Content. Atmospheric exposure tests disclose that Junior Beams, with .20% Copper have as much as four times the resistance to corrosion as non-copper metals. They are braced with structural angle, welded to frame for maximum rigidity and compactness. Conveyors are equipped with 5" roll diam. idlers and return rolls. 20" diam. head pulley and 16" diam. tail pulley mounted on 2 1/4" or 2 7/16" diam. shaft. We take our loss on our stock of short length belting. You can save as much as 50% on the BONDED CONVEYOR SPECIALS, with conveyor belting in two pieces. Belt is new 4-ply 28-oz. duck, 1/8" top rubber cover x 1/32" bottom cover and is fresh stock guaranteed to meet or exceed listed specifications.

Remember, You Save Up to 50%—Conveyor Prices Include Belting

	8" JR. I BEAM FRAME CONVEYOR				TRUSS FRAME CONVEYOR		
Belt Width	Conveyor Length	List Price	Sale Price	Add or Deduct Per Foot	List Price	Sale Price	Add or Deduct Per Five Feet
14"	25'	$1425	$ 753				
14"	50'	2266	1182	$17.18			
14"	85'	3445	1783				
16"	20'	1287	680				
16"	45'	2180	1140				
16"	60'	2715	1416	18.40			
16"	90'	3786	1969				
18"	25'	1507	813		$2301	$1104	
18"	45'	2261	1206		3279	1573	
18"	70'	3205	1696		4491	2159	
18"	85'	3771	1991	19.62	5171	2510	117.20
18"	100'	4337	2285		5896	2862	
18"	130'	5469	2873		7273	3565	
20"	25'	1547	852		2288	1150	
20"	60'	2940	1579		3992	2017	
20"	75'	3536	1891	20.78	4799	2388	123.81
20"	90'	4133	2202		5546	2759	
24"	25'	1622	916		2389	1201	
24"	45'	2479	1361		3515	1723	
24"	70'	3550	1916		4705	2377	
24"	100'	4835	2583	22.22	6257	3160	130.66
24"	120'	5692	3026		7403	3683	
24"	150'	6977	3693		8843	4467	
30"	50'	2969	1649		3994	2018	
30"	70'	3948	2154	25.25	5162	2594	144.18
30"	90'	4928	2659		6374	3171	
36"	25'	1854	1140		3738	1866	
36"	45'	2915	1711		4059	2024	
36"	60'	3711	2138	28.51	4939	2497	157.64
36"	100'	5832	3278		7534	3758	
	WRITE FOR BULLETIN #1138				WRITE FOR BULLETIN #1189		

BONDED® GENERAL DUTY AND HEAVY DUTY VIBRATING SCREENS

Type A

Type B

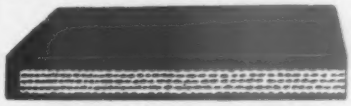
For mineral, chemical and other industrial products. Fast, efficient and economical for cleaning, sizing, grading, dewatering. Made in all metals, including stainless steel. Enclosed models for hot materials or dust control. Bonded screens are built for any screening operation, wet or dry.

PERFECT BALANCE AND SHARP ACTION. Eccentric weight mechanism, spring mounted. 1 to 3 decks, 2' x 4' to 3' x 8'. **WRITE FOR "SEVEN SECRETS OF SUCCESSFUL SCREENING" IN BULLETIN NO. 1086.**
PRICED FROM $443

FACTORY BALANCED, CONTROLLED VIBRATION. Four bearing positive throw eccentric shaft; 3' x 6' to 5' x 14'. 1 to 5 decks.
WRITE FOR BULLETIN NO. 1087 AND "9 REASONS WHY BONDED IS YOUR BEST BUY." PRICED FROM $1620.

TESTED CONVEYOR BELTING*

We pay freight on 200 pounds or over plus an additional 10% savings from sale price for full rolls 500 to 650 feet.



Major Brand: 12# to 15# Average Friction Pull. 800# to 1000# Average Cover Tensile.

Heavy Duty 4-ply, 28-oz. duck, 1/8" top rubber cover x 1/32" bottom rubber cover belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stocks.

Width	Ply	List Price	Sale Price
14"	4	$3.78 ft.	$2.94 ft.
16"	4	4.24 ft.	3.09 ft.
18"	4	4.69 ft.	3.42 ft.
20"	4	5.17 ft.	3.95 ft.
24"	4	6.08 ft.	4.43 ft.
30"	4	7.47 ft.	5.42 ft.
36"	4	8.85 ft.	6.43 ft.

Major Bee Brand: 16# to 19# Average Friction Pull, 2400# to 3000# Average Cover Tensile. Skim coat between plies.

A high grade of heavy duty 4 and 5-ply, 28 oz. duck, 1/8" top rubber cover x 1/32" bottom rubber cover. These belts are for more severe service, high tonnages and abrasion resistance. For handling stone, mineral ores, concrete, cement, coal, and other similar materials, both wet and dry. Belts have molded rubber edges.

Width	Ply	List Price	Sale Price
14"	4	$4.48 ft.	$3.18 ft.
16"	4	5.04 ft.	3.60 ft.
18"	4	5.61 ft.	3.98 ft.
20"	4	6.14 ft.	4.54 ft.
24"	4	7.22 ft.	5.14 ft.
30"	4	8.87 ft.	6.31 ft.
36"	4	10.49 ft.	7.64 ft.
24"	5	8.47 ft.	6.01 ft.

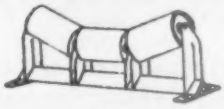
***All belting is tested by the Engineering laboratory of one of the largest universities in the United States. It is guaranteed to meet or exceed listed specifications.**

Other widths, plies, duck weights and cover thickness available at low prices.

WRITE FOR FREE SAMPLE & BULL. #1263

BONDED® IDLERS AND RETURN ROLLS

SAVE 25% AND MORE



3-roll, 5" diameter Troughing Idlers for:			
14" belt	$19.75	24" belt	$22.75
16" belt	20.50	30" belt	23.85
18" belt	21.90	36" belt	24.90
20" belt	22.10	48" belt	27.50

1-roll, 5" diameter Return Rolls for:			
14" belt	$ 8.50	24" belt	$11.00
16" belt	9.00	30" belt	12.50
18" belt	9.50	36" belt	13.75
20" belt	10.00	48" belt	16.50

All steel. Interchangeable with other well-known makes. Furnished with replaceable prelubricated sealed ball bearings. Maintenance is negligible. WRITE FOR BULLETIN #1138.

BONDED SCALE AND MACHINE COMPANY

PHONE Days: Hickory 4-2186 — **WRITE FOR FREE CATALOG AND PRICES** — **PHONE Evenings: AX. 1-2213 or TEmple 7-4519**

128 Bellevue — **Mfrs. of Scales, Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers and Feeders** — **COLUMBUS 7, OHIO**

A VERY LARGE AUCTION

MON. MAY 2nd, TUES. MAY 3rd

BUTTE, MONTANA

Kiely Construction Co, Mr. Bill Kiely, is quitting the contracting business and selling his equipment, large and small, sale will be held on his lot.

EACH PIECE POSITIVELY SELLS REGARDLESS OF PRICE—NO BID INS—NO BUY BACKS.

CRUSHING EQUIPMENT:—Cedar Rapids Primary Portable Crusher, 30x40, heavy duty—used less than one year. Cedar Rapids secondary Roll Crusher, 40x24 roller bearing crusher, 48" x 12' dd vib screen—Portable. GMC 671 twin power unit. Symons Cone Crusher 4' cone, dd 4x12 vib screen, GMC 6-110 power, portable, Used less than year. Cedar Rapids twin jaw crusher, 18x36 roller bearing twin jaw crusher, 48"x10' dd scalp screen ME-66 power, Portable. Pioneer 46VE Portable crusher, 1036 jaw 4011 roll, 48"x12' 3½ deck vib screen. Cat D-13000 Elec set. Murphy ME-650 Power unit—all portable. G-D Air-Trac drill like new. Hewett-Robbins Portable 14x15 triple deck screen, used less than year. Portable crusher trap w/36"x30' conveyor. Kolman Portable loader w/50'x 42" conveyor. 10 Portable conveyors from 36"x60' to 24" x50'. Pioneer 24"x6' apron feeder. Challenger twin Rotary drill w/IR Gyro 600 cfm comp on HD-19 tractor. Murphy 60 ton portable scale. Other crusher equip.

ASPHALT PLANTS AND ASPHALT EQUIPMENT:—Madsen Portable 4,000 lb Model 481 Asphalt plant all complete including elec sets, power units, etc. Two 17,-500, 8,000 & 4,400 gal asph storage tanks, insulated and coiled-portable. Cedar Rapids 2500 lb Model FA Portable Asphalt plant, all complete w/elec sets and power. Two 8,000, 6,000 and 3,400 gal asph storage insulated, coiled and portable tanks. BOTH OF THESE PLANTS VERY GOOD. C-B Model 1A-BBC Tank car heater and booster, portable. Blaw-Knox PF-90 asph paver. B-G 879A asph paver. Flaherty S-P spreader. Buffalo-Springfield, Triple axle tandem roller, and two 8-10 ton tandem rollers. Other asphalt equipment.

TRACTORS - MOTOR SCRAPERS - MOTOR GRADERS - SCRAPERS:—Two Cat D-9's, 18A's w/Cat 9S dozers and Cat hyd rear rippers. Cat D-8, 36A—Less than yr old, w/8A dozer & #30 CCU. 4 Cat D-8's, 14A's, w/8A and 8U dozers & CCU's; 2 Later 2U Cat D-8's w/8U & 8A dozers; Cat D6, 9U, w/6A dozer. 2 AC HD-21's, one w/dozer. 3 Cat DW-21 Motor Scrapers, 69C's w/470 Scrapers-good. 2 Cat DW-20's w/Cat 20 Scrapers, modified & good. 3 Cat 90 and one Cat 80 Pull Scrapers. 4 Cat #12 Motor Graders, 8T's 3/oil clutchers, scarifiers, hyd steer.

FRONT END LOADERS - LOWBOYS - DUMP TRUCKS-TRUCKS:—Michigan 375A Loader, 6 yard, NOT USED FULL SEASON. Michigan 175 AD Diesel front loader. Cat #6 Shovel. Two Peerless 40 ton Lowboys, tandem—like new. 2 Mack '56 tandem B60, Mack B42 '55 tandem and '54 Ford F800 dump trucks. Kenworth tandem Cummins Diesel '50 dump truck. Mack tandem Cummins diesel '54 truck-tractor w/winch-very good. IHC 4064 Westcoaster, 1947, truck tractor Cummins diesel w/winch. GMC Diesel 970 tandem 4,150 water truck. Complete Lubrovan lube unit on '56 GMC Truck. 7 Ford & Chev pickups. Other trucks & trailers. Two 1,000 gallon distributors. Water trucks and trailers.

SHOVEL - BACKHOE - TRUCK - CRANE - ROLLERS - END & REAR DUMPS-ELEC SETS:—Koehring 304 w/shovel front. Koehring dragline on Murty tandem diesel carrier, 304. Two 304 backhoe attachments. Buckets. Seman Andwall 5620 s-p compactor. 2 Essick vib rollers. pneu rollers; LeT & Ferg triple drum sheepfoots; Cat #28 ripper; 3 Euclid 27FD End Dumps. 5 Euclid 9FTD Bottom Dumps. 4 Peerless 20 yard bottom dump trailers, used 800 hrs. Cat D13000 and Cat D8800 elec sets. Other items.

MISCELLANEOUS EQUIPMENT:—3 G-D compressors, 600, 500, 105 cfm. Air tools. Parsons 310 & B-g 44C Ditchers. Welders. Steam generator. Stationary cement plant. Concrete equipment. Wheel Tractors. Quantities of small items, shop tools. Quantities of AC, Cat, NW and various new and used parts.

All equipment owned by Kiely Construction Co., WRITE-WIRE Auction firm for complete comprehensive sale bill. Remember EACH PIECE POSITIVELY SELLS REGARDLESS OF PRICE. FINANCING AVAILABLE on items over $2,000, no prequalification necessary.

FORKE BROTHERS
the Auctioneers
321 Sharp Bldg. **Lincoln, Nebraska** HEmlock 2-1045
— EQUIPMENT AUCTION LEADERSHIP SINCE 1921 —

KIELY CONSTRUCTION CO.
owner
BUTTE, MONTANA

YOU CAN SAVE MONEY AND MAKE A PROFIT ON THIS EQUIPMENT

QUARRY EQUIPMENT

Cedarapids 2236 primary jaw crushing plant.
Cedarapids Jr. tandem crushing plant, 1036 jaw.
Cedarapids 6C, portable secondary plant.
Cedarapids 1210 twin jaw crusher.
Cedarapids 1036 Jaw Crusher. Reconditioned.
Universal 2436 Jaw Crusher. Reconditioned.
Austin-Western 1536 jaw crusher.
2—Cedarapids 4033 hammermills rebuilt.
Cedarapids 2033 hammermill. Slightly used.
Cedarapids 4' x 14' 3-deck screen.
3—Cedarapids 4' x 12' 3-deck screens. Rebuilt.
Robins 4' x 9' triple deck screen.
Pioneer 4' x 8' double deck screen. Rebuilt.
Telsmith 3' x 8', 3-deck inclined screen.
Aggregates 4' x 14', 3-deck inclined screen.
54" dia. x 22' lg. revolving screen.
4' x 6'6" heavy duty reciprocating feeder.
2—Cedarapids 42" x 10' apron feeders.
Cedarapids 30-B, 3-compartment charging hopper, apron feeder, bucket elevator. New.
Eagle 36"x20' double log washer. Good.
McLanahan & Stone 8'x30' double log washer.
Smitheo 10-Yd. Portable Charging Bin.
8' x 12', 8' x 18', 13' x 23' bins in stock
18", 24", 30", 36" conveyors & belting

SHOVELS AND CRANES

Lorain L-36, ¾-yd. diesel dragline. Excellent.
Lima 34 Paymaster ⅝-yd. diesel shovel. Good.
Unit 1020 ¾-yd. diesel powered shovel.
Koehring 304, ⅜-yd. diesel shovel-backhoe.
Insley K-12, ½-yd. gas backhoe
Bucyrus-Erie 10B, ⅜-yd. Gas Shovel.
Byers 83-CC, 20-ton truck crane.
Lorain MC-414, 20-ton Moto-Crane.
Link Belt HC-90, 25-ton truck crane.
Michigan TLDT-20, 10-ton truck crane.
Lorain MC-254W, 17½ ton Moto-Crane
Lorain MC-254, 15-ton Moto-crane.
Lorain TL-20, 10-ton Moto-crane.

TRUCKS, TRACTORS, SCRAPERS

2—Euclid 13-yd. bottom dumps. Good.
2—Euclid 27FD, 15-ton rear dumps.
1—Euclid tractor with 3200 gallon water tank.
1—Caterpillar D-8 with cable Angledozer.
1—Caterpillar D-8 with Heil scraper.
1—Caterpillar D-7 with hydraulic angledozer.
1—Caterpillar D-6 tractor only.
1—Euclid TC-12, twin engine tractor
1—International TD-24 with cable angledozer.
1—Letourneau Super C Tournadozer. Excellent.
1—Allis-Chalmers HD-9-G Tractor with loader.
2—Allis Chalmers TS-360, 15-yd. scrapers.
2—Euclid TS-24, 24-yd. twin engine scrapers
2—Euclid TS-18, 18-yd. twin engine scrapers.
3—Euclid 18-yd. overhung engine scrapers.
1—Euclid 15½-yd. six wheel scraper.
3—Euclid 7-yd. overhung engine scrapers.

Inquire for list of drilling equipment, air compressors, diesel power units, generators, shovel & backhoe attachments.

L. B. SMITH, INC.

Camp Hill, Pa.

Phone Harrisburg REgent 7-3431

IF ITS GOLD YOU WANT, GRAB THIS RARE PACKAGE DEAL.

FOR SALE: COMPLETE GOLD DREDGING & WASHING SET UP.

1—D-8—Cat Model 2U—with cat cable angle dozer. Electric start, cargo winch, Heavy duty front idlers and protective top cab. Good working condition.

1—Model #6 Northwest Dragline—with 65' boom—1½ yd. drag bucket. Fair lead, M-E-6 Murphy engine. 2000 Watt — Kohler Light plant. Excellent condition.

1—35—KVA. Caterpillar power. Diesel Electric plant on skids, large fuel tank 220/440—110 volt. Electric starter. Excellent condition.

1—6" High Pressure Pump. Gas powered. Good condition.

1—5'x20' Trommel Screen, scrubber and washer. Pitcher model Gold plant on Athy tracks and front slip shoe. Electric motor and roller chain belly drive on screen. Good condition.

18' Columbia House trailer. Good condition.

TOTAL PACKAGE PRICE $42,750.00

ZANETTI BROTHERS

P.O. Box 500, Osburn, Idaho

LIQUIDATION

CRUSHING & GRINDING PLANT

MANCHESTER, CONN.

2—Symons 3' short head cone crushers, 50 HP
2—Hardinge 7' x 36" conical pebble mills, silex lined
2—Buchanan 13" x 24" jaw crushers, 50 HP
19—Abbe Eng. 6' x 18' pebble mills.
1—Allis-Chalmers 6' x 18' pebble-tube mill
1—Christie 4'6" x 45' long dryer
5—Bucket elevators; up to 40' high
1—Dings magnetic separator
1—Pangborn dust collector, 15 HP

SEND FOR CIRCULAR!

MILLS

BALL, Kennedy 7' x 9', 150 HP
CONICAL BALL, Hardinge 10' x 48"
CONICAL BALL, Hardinge 4' x 16"
BALL-TUBE, Allis 5' x 22', 150 HP

DRYERS & KILNS

10' x 78' DRYERS, ¾" shell, 2-tires, 4' dia. center tube
11' x 10' x 175' Vulcan Kiln, 13/16" shell, 2-tires
11' x 155' Traylor Kiln, ¾" shell
8' x 70' Ruggles Coles, 5/8" shell
8' x 40' Stearns-Rogers dryer, 5/8"
7'6" x 100' Kiln, ½" shell
7'6" x 60' Kiln, ½" welded shell
6' x 7' x 100' Kiln, 7/8" shell
7' x 50' Allis-Chalmers Dryer, 5/8"
6' x 50' Louisville Dryer

CRUSHERS—PULVERIZERS

JAW, 36" x 15", 20" x 6", 18" x 9", 13" x 24", 8" x 10"
BABCOCK & WILCOX Type E-32
RAYMOND #5057 hi-side mill
HAMMERMILLS, PENNA. C3-30
HAMMERMILL, PENNA. #5060 UNUSED, 400 HP, Non-Clog
ROBINSON 36" Saw-tooth, 15 HP

PERRY EQUIPMENT CORPORATION

1418 N. Sixth St. Phila. 22, Pa.

POplar 3-3505

3—10'x78' Dryers—3654 Jaw Crusher 30" Merrick Weightometer—36" S.A. Feeder 106' long—48" x 120' Feeder conveyor—Syntron Screen Conv. 24" x 31'—Syntron F86 feeder—6' x 14' Vib. Feeders—60" x 300' & 150' Conv. 3620 Dixie Non Clog Moving Plate Hammermills Asphalt Plants—Hydrated Lime Plant—2'3'4' Symons & Telsmith Cones—66FC Tel. Cone—Port. 24" x 25' Eagle sgl Fine Screw other sizes. Jaw—Cone—Gyratory—Roll dbl & triple—Hammermills & Impact crushers—Ball—Rod Tube—Screening, Washing and Crushing Plants. Classifiers, Compressors, Conveyors, Cranes, Drills, Dump Cars, Dredges, Feeders, Hoists, Motors, Generators, Kilns, Dryers, Locomotives, Pumps, Screens, Shovels, Draglines, Transformers, Euclid Trucks.

STANLEY B. TROYER EQUIP. CO.
Box 97 Phone 500 Crosby, Minnesota

LIQUIDATION

COMPLETE CEMENT PLANT

AKRON, N. Y.

2—Allis Chalmers 8' x 100' Rotary Kiln.
1—Raymond 36" Bowl Mill, 50 HP.
1—Vulcan 6' x 50' Dryer, 25 HP.
1—Clyde #3 Hydrator with motor.
1—Raymond 16' Double Whizzer Separator, 75 HP.
14—Bucket Elevators, chain mounted, steel casing, 25' to 56' c.c.
1200'—9" and 14" Screw Conveyor.
15—Bins from 6'x7'6"x12" to 17'x20'x12'.
1—Steel Building, 60' x 80' x 40' high.
1—Steel Building, 65' x 125' x 40' high.

OTHER LOCATIONS

1—Williams "Titan" 5 roll High Side Mill, 100 HP TEFC motor, 8' dia. Separator, complete with piping, fan, cyclone, Pangborn dust collector & many spare parts.

ROTARY KILNS—DRYERS—COOLERS

1—Traylor 11' x 155' Rotary Kiln, 7/8" shell.
1—Allis Chalmers 9' x 130' Rotary Kiln, 3/4" shell.
1—Vulcan 8' x 87', ½" shell.
2—Vulcan 7' x 80', ½" shell.
2—Link Belt Roto Louvre Dryers, 6'4" x 24'
1—Rennenberg 6' x 50', 3/8" shell.
1—Ruggles Cole 5' x 30', 3/8" shell.
1—Allis Chalmers 4' x 40'.
1—Allis Chalmers 4' x 30', 3/8" shell.
1—34" x 30', 1/4" shell.

MILLS—CRUSHERS—PULVERIZERS

2—Traylor Compeb Mill 7' x 27' with 1—500 HP & 1—600 HP motor 3/60/440.
1—Hardinge 4½' x 24" Steel Conical Mill.
1—Denver 3' x 5' Continuous Ball Mill
1—Telsmith Reduction Crusher No. 46, 50 HP.
2—Kennedy #6 Gyratory Crushers, 50 HP.
5—Jaw Crushers 12" x 18" to 36" x 48".
1—Penn. Non-Clog Swing Hammermill, size 5060, 47" x 60", cap. 200—275 tons per hour, requires 400 HP motor UNUSED.
1—Penn. Super-Thor Hammermill, size SXT13, 250 HP.

AIR SEPARATORS—SCREENS

1—18' dia. Raymond Double Whizzer Separator with 100 HP motor.
1—14' dia. Raymond Double Whizzer Separator with 60 HP motor.
1—10' dia. Raymond Single Whizzer Separator.
1—Raymond 30" dia. Whizzer Separator.
1—Tyler Hummer Screen 4' x 10'.

CONVEYORS

1—Fuller-Kinyon Conveying System type H257, 100 HP.
2—Fuller-Kinyon Conveying Systems type 10B-No. R, 75 HP.

Your Inquiries Solicited—Send for Circulars

BRILL EQUIPMENT COMPANY

35-37 Jabez Street, Newark 5, N. J.

Tel: Market 3-7420

2—14 x 24 Reliance Jaw Rebuilt
2—25½ Kennedy Gyratory Rebuilt
1—3 x 10 Sees 3 Deck Screen

LOCKE EQUIP. CO. INC.
Box 212 R Sta., Kingston, N. Y.
FE 1-0201 or FE 1-6300

SPECIALS!!!
Buffalo type B 60 ton motor truck scales 45' x 12' platform, tape recorder and printer
Fuller-Kenyon Type "C" cement unloader.
Fuller Kenyon Airslide cement conveying system
Schram 600 ft. portable air compressor. GMC.
Int. TD-142 Skid shovel 2¼ yd.

TRUCKS
4 Mack B-63-6 trucks, 12 yds. Heil dump bodies. 10 Euclid 28 FD rear dumps 15 ton cap. Cummins 13 Euclids rear dump 12 FD 15 ton; 7 Euclid bottom dump 43 RDT 18 ton
Mack tandem trucks HI disc. Some new condition 8 Euclid Model 25 LDT, 25 yd., bottom dump

CRUSHERS—KILNS—DRYERS
JAW: Reliance, 14x24. Buchanan 18x36, 36x42, Type C 30x42. Cedar Rapids 2036, Traylor 28x36, 36x48, 50x72. Lippman 24x36; Universal 30x42; Superior McCully 42x40.
GYRATORY: Al. Chal. 8, 5K. 10", 16. Gates 12K; Traylor TZ Kennedy Van Saun 37½.
CONE: Symons 3', 4¼', 5½'. Kue-Ken 36"; Traylor TT4; Telsmith 3'.
ROLL: Cedar Rapids 24x16, 55x30; Al. Chal. 37x16, 42x16. Pioneer 40x22, 40x24 triple, 54x24; Telsmith 40x22; Universal 30x18; Lippman 40x20.
MILLS—ROD—Denver 4x8, 4x10; Hardinge 4x10; Marcy 3x8, 8x12.
TUBE: Al. Chal. 6x22. Smidth 5½x20, 6'6"x21; Hardinge 4½x16" 8x18"; 8x9"; 8x36; 8x48; 10x48.
HAMMERMILLS: Penn 8XT-350 HP motor, 6XR 10'x7"; Stedman 24x30, 36x42; Cedar Rapids 50-50, 2033, 30x33, 30x42 double; Dixie 36x50.
AUTOCLAVES: J&C 6'6"x58" Quick Acting.
KILNS: 6'x56'; 9'x100'; 8x124'.
DRYERS: 6'x40, 6x60, 8x72.

CRUSHING—WASHING—CLASSIFIER
Eagle log washers Model BMD 48"x30"; BMD 4322 7'x21' Twin, 36"x20' dbl. log washer, running gear, 36"x30'.
Pioneer Port. 10x24 jaw, 24x16 roll. Complete Diesel.
C-R Prim. Port 22x36. Diesel.
Diamond Wee-Con Port. Prim. 20x36" crusher.

CONCRETE PLANTS AND EQUIPMENT
Johnson 150 ton 3 compt. aggr. cement silo, 1500 bbls. Complete.
Johnson 400 yd 6 compt. aggr. large capacity.
Johnson automatic batch, 10,000 bbl. cement storage
Johnson TY 227, 70 cu. yds. 105 ton 3 compt. aggr. bin TY 168 batcher
Noble CA 354, 4 compt. large capacity. Complete
Noble CA 154, 150 tons 4 compts. aggregate cement silo 2000 yds.
Erie Strayer 120 tons aggr. bin, 890 bbls. cement
Erie Strayer, new 1955, 40 yds per hour.
Blaw-Knox BCPC 600 bbl. cement silo
Blaw-Knox BCPC 300 bbl. cement bin
Mixermobile Model M5, 2 yd capacity w/tower, new motor, etc.

SUCTION DREDGES FOR SAND-GRAVEL
Morris 6" Diesel on 14'x36' hull
Ellicott 14" x 12" Steel Hull 64' x 32' Diesel.
10" Portable Diesel powered. Complete.
Amsco 12" suc. 10" Dis. Hull 24'x50' Diesel-Elec.
Ellicott 8" with cutter. Diesel Hull 48'x18'x3'6"
8" Hydraulic Diesel. On 32'x8' steel pontoons
6" portable Diesel complete with cutters, etc.

SCREENS
Tyler-Hummer 4'x10' 2 Deck
New Symons 3'x12' 5 HP Elec. Motor.
Pioneer 5'x12' 3 deck spring suspension
Cedar Rapids 4'x12' dbl. deck 25 H.P. elec. motor
Pioneer 5'x12' 2 deck 20 HP elec. motor
C-R 4'x14' 2 deck 25 HP motor

RICHARD P. WALSH CO.
30 Church St. New York 7, N. Y.
CO 7-0723 Cable: RICHWALSH

LARGE PORTABLE CRUSHING PLANT

CEDARAPIDS 3240 IMPACTOR PORTABLE w/14' apron feeder, vibrating grizzly, conveyor, 610 GM diesel, mounted factory tandem axles, pneumatic tires, dolly.

CEDARAPIDS 4033 HAMMERMILL SECONDARY PORTABLE w/4x14 3-deck vibr. screen, rotovator, plant & delivery conveyors, Twin 671 GM diesel, tandem axles, pneumatic tires

Above Plants are 4 years old, just rebuilt by the factory and run 4 months. Excellent condition. Priced at $65,000 for the two, appr. 50% of new cost. Terms available.

WENZEL MACHY. CO.
565 S. 10th, Kansas City, Kans. Mayfair 11710

FOR SALE
¾ yd. Heavy duty material handling bucket good condition—price $650.00
60 TPH chain bucket elevator new cond. $2000.00
20 HP Fulton Boiler $500.00

THE McENERY COMPANY
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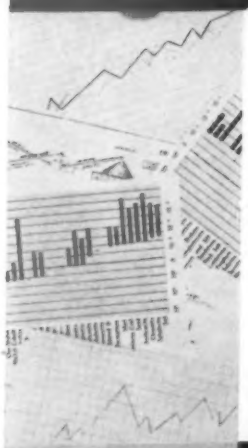

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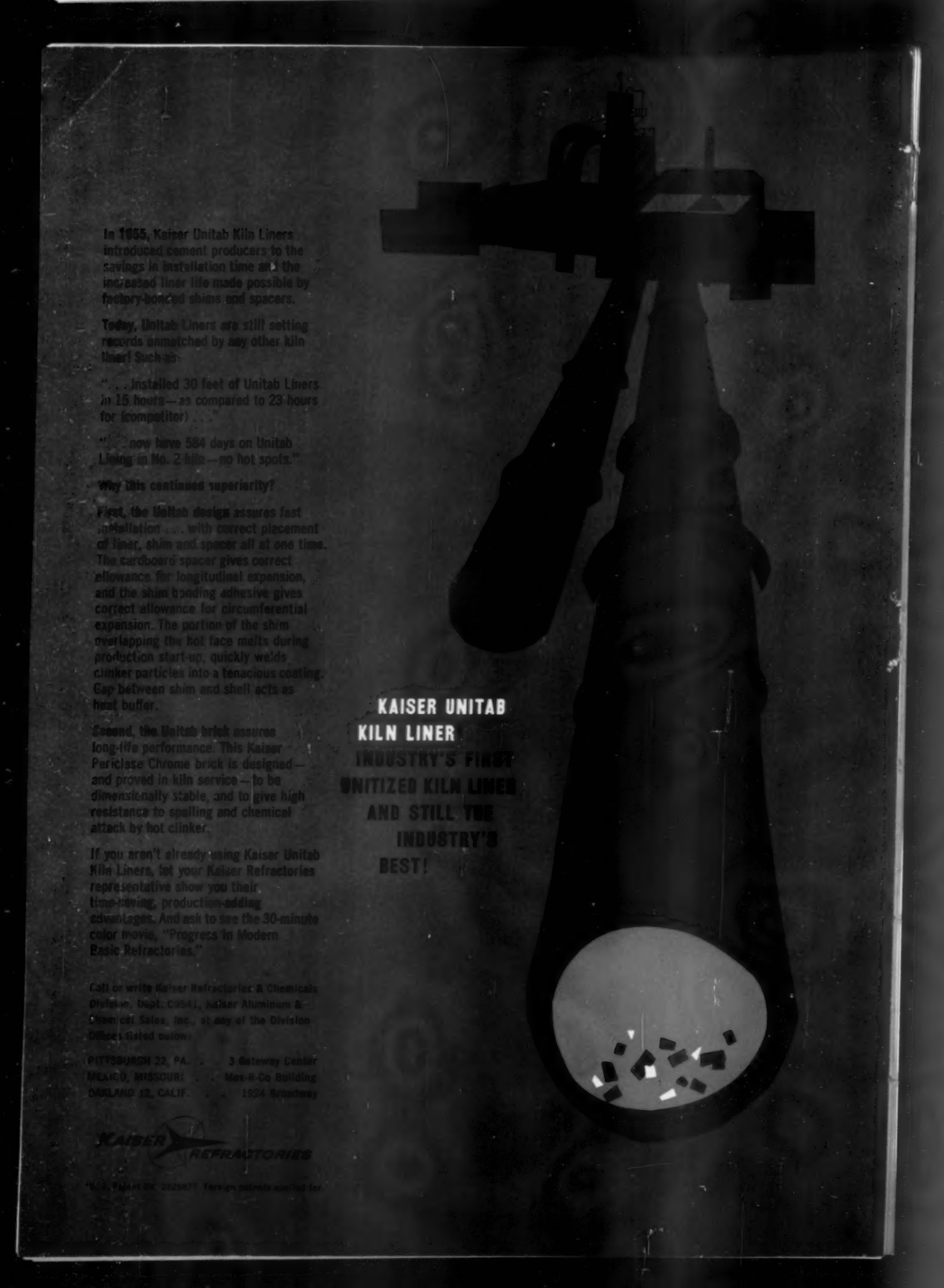

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